Biological Evaluation for Sensitive Wildlife Species,

Biological Assessment for Threatened and Endangered Species

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I. INTRODUCTION

The purpose of this Biological Evaluation is to determine the likely effects of the Proposed Action and alternatives on federally listed species (endangered, threatened, and proposed) and Forest Service sensitive species.

Section 7 of the Endangered Species Act of 1973, as amended, requires federal agencies to use their authority to carry out programs to conserve endangered and threatened species, and to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of listed or proposed species, or result in the destruction or adverse modification of their critical habitat. A Biological Assessment must be prepared for federal actions that are "major construction activities" (a project significantly affecting the quality of the human environment) to evaluate the potential effects of the proposal on listed or proposed species.

The Forest Service has established direction in *Forest Service Manual 2670* to guide habitat management for proposed, endangered, threatened, and sensitive species. Preparation of a Biological Evaluation as part of the National Environmental Policy Act (NEPA) process ensures that these species receive full consideration in the decision-making process. This Biological Evaluation also meets the requirements of a Biological Assessment.

II. DESCRIPTION OF THE PROPOSAL

The Forest Service is analyzing proposed vegetation treatments in the Trout and West Creek watersheds on the Pike National Forest. The purpose and need of this proposal is to reduce fuels in the project area, to moderate the potential adverse effects of wildfire, provide for firefighter and public safety, and to reflect historic vegetation conditions that are thought to be more sustainable than the current condition.

These actions would include thinning in the overstory and understory but retaining the largest trees in the overstory. Heavy thinning would include the potential for sawlog removal through ground-based logging equipment or helicopters. Light thinning would mostly treat the biomass on-site. Broadcast burning would also occur in most alternatives. Temporary road construction and restoration of temporary and existing non-system roads is also proposed.

The Proposed Action includes thinning of about 20,000 acres; yarding sawlogs from about 19,000 of these acres; construction of about 14 miles of temporary roads to facilitate sawlog removal; restoration to near natural conditions of about 48 miles of existing unclassified roads once they are no longer needed to facilitate sawlog removal; and follow up slash treatments such as piling and burning of slash. Thinning would occur within six treatment units. The Trail Unit was dropped from consideration following the Hayman Fire in 2002.

Six action alternatives were fully analyzed. Alternative A would include mechanical treatment as proposed, but would not use prescribed burning to reduce fuels. Alternative B would implement the Proposed Action on a portion of the project area within one mile of private property that contains at least one home per 40 acres. Alternative C would implement the Proposed Action without building any new temporary roads, which would require increased helicopter yarding. Alternative D would treat vegetation within ¼ mile of private property with at least one home per 40 acres. Alternative E would treat the project area (approximately 26,320 acres) most aggressively, and would include harvest openings on 30% of the project area to mimic historic conditions. See the EIS for a full description and maps for each of the alternatives.

Project Area

The project area is predominantly in Teller County, but includes small amounts of Douglas County to the north and El Paso County to the east. This area includes the Trout Creek and West Creek drainages. The area is dominated by ponderosa pine, along with Douglas-fir and aspen. The EIS provides more information on the existing vegetation.

The Wildlife Analysis Area (WAA) is the area covered by Forest Plan Diversity Units 918-925 and 930. The WAA includes all of the treatment units as well as Forest areas between treatment units and areas to the north, which are also in the Trout and West Creek watersheds. Table 1 shows the existing vegetation in the WAA.

Table 1. Existing Vegetation in Wildlife Analysis Area

Vegetation type	Area (acres)	Area (%)
Coniferous forest	70,417	91
Aspen	1,452	2
Grassland	4,492	6
Shrubland	1,163	1
Total	77,679	100

The forests within the WAA typically have a closed canopy. Based on Forest Resource Inventory System (RIS) data, the forested areas are distributed as shown in Table 2 (pre-Hayman Fire) and Table 3 (post-Hayman Fire).

Table 2. Forest habitat types and percent of the area of the WAA by canopy cover class, before the 2002 Hayman wildfire

Forested cover classes	Acres	Percent
0-10% canopy closure	6,300	8%
11-40% canopy closure	7,340	9%
41-70% canopy closure	48,940	63%
71-100% canopy closure	10,070	13%

Table 3. Forest habitat types and percent of the area of the WAA by canopy cover class, after the 2002 Hayman wildfire

Forested cover classes	Acres	Percent
0-10% canopy closure	17,242	22%
11-40% canopy closure	7,340	9%
41-70% canopy closure	39,637	51%
71-100% canopy closure	8,147	11%

As shown in the above tables, the 2002 Hayman wildfire resulted in an increase in open, early seral stands (from 8% to 22%) and a decrease in closed canopy stands. However, the 62% of the WAA is still in forested stands with canopy cover over 40%.

Historically, the WAA was open ponderosa pine forest, with some persistent openings across the landscape. With a reduction in wildfire, stand density has increased. Currently the WAA is used for dispersed recreation and includes numerous subdivisions.

Forest Plan management direction includes rural and non-roaded natural recreation, riparian management, wildlife management indicator species management, and wood fiber production.

III. SPECIES CONSIDERED AND THEIR STATUS

Table 4 lists the threatened, endangered, and Forest Service Sensitive (TES) species with potential to occur in the Trout-West project area.

Table 4. TES Wildlife Species Potentially Occurring in the Project Area

Species	Scientific Name	Status	Suitable habitat present?	Known or Expected to be present?	Species carried forward in analysis
Mammals					
Dwarf shrew	*Sorex nanus*	S	Y	Y	N
Fringed-tailed myotis	*Myotis thysanodes pahasapensis*	S	Y	Y	N
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	T	Y	Y	Y
Ringtail	*Bassariscus astutus*	S	N	N	N
Townsend's big-eared bat	*Plecotus townsendii*	S	Y	N	N
Black-tailed prairie dog	*Cynomys ludovicianus*	C	N	N	N
Wolverine	*Gulo gulo luscens*	S	Y	N	N
Wet Mtns yellow-bellied marmot	*Marmot flavinentris notioros*	S	N	N	N
American marten	*Martes americana*	S	Y	N	N
Colorado hog-nosed skunk	*Conepatus mesoleucus figginsi*	S	N	N	N
Spotted bat	*Euderma maculatum*	S	N	N	N
Birds					
Bald eagle	*Haliaeetus leucocephalus*	T	Y	N	Y
Black tern	*Chlidonias niger*	S	N	N	N
Flammulated owl	*Otus flammeolus*	S	Y	Y	Y
Fox sparrow	*Passerella iliaca*	S	Y	Y	Y
Golden-crowned kinglet	*Regulus satrapa*	S	Y	Y	Y
Lewis' woodpecker	*Melanerpes lewis*	S, MIS	Y	Y	Y
Merlin	*Falco columbarius*	S	Y	N	N
Mexican spotted owl	*Strix occidentalis lucida*	T, S	Y	N	Y
Northern goshawk	*Accipiter gentilis*	S	Y	Y	Y
Olive-sided flycatcher	*Contopus borealis*	S	Y	Y	N
Osprey	*Pandion haliaetus*	S	N	N	N
Peregrine falcon	*Falco peregrinus*	S, MIS	Y	N	N
Pygmy nuthatch	*Sitta pygmaea*	S	Y	Y	Y
Three-toed woodpecker	*Picoides tridactylus*	S, MIS	Y	Y	Y
Common loon	*Gavia immer*	S	N	N	N
Harlequin duck	*Histrionicus histrionicus*	S	N	N	N
American bittern	*Botaurus lentiginosus*	S	N	N	N
White-faced ibis	*Plegadis chihi*	S	N	N	N
Greater sandhill crane	*Grus canadensis tabida*	S	N	N	N
Birds, con't					

Species	Scientific Name	Status	Suitable habitat present?	Known or Expected to be present?	Species carried forward in analysis
Long-billed curlew	*Numenius americanus*	S	N	N	N
Black swift	*Cypseloides niger*	S	N	N	N
Boreal owl	*Aegolius funereus*	S	N	N	N
Purple martin	*Progne subis*	S	N	N	N
Loggerhead shrike	*Lanius ludovicianus*	S	N	N	N
Invertebrates					
Pawnee montane skipper	*Hesperia leonardus montana*	T	Y	Y	Y
Regal fritillary	*Speyeria idalia*	S	N	N	N
Amphibians and Reptiles					
Boreal toad	*Bufo boreas boreas*	e, S, C	N	N	N
Northern leopard frog	*Rana pipiens*	S	Y	Y	Y
Tiger salamander	*Ambystoma tigrinum*	S	Y	Y	Y
Fish					
Flathead chub	*Hybopsis gradiis*	S	N	N	N
Southern redbelly dace	*Phoxinus erythrogaster*	S	N	N	N
Plains topminnow	*Fundulus sciadicus*	S	N	N	N
Greenback cutthroat trout	*Oncorhynchus clarki stomias*	T	N	N	N

MIS = Management Indicator Species, S = R2 Sensitive Species, T = Threatened, E = Endangered, C = Candidate, e = state endangered

Note: Rationale for species not carried forward is found in Section XI.

IV. CONSULTATION HISTORY

The U.S. Fish and Wildlife Service (USFWS) provided a species list for the project area, which was used to identify threatened, endangered, and candidate species to be considered (USFWS 3/13/02). Additional conversations with the USFWS (L. Ellwood 3/4/02; L. Ellwood 4/9/02; J. Peterson 4/10/02; J. Peterson 4/26/02) provided additional information on species potential and clarification of the proposal.

In addition, a field trip with Jeff Peterson on 4/19/02 reviewed the Missouri Gulch area for potential Mexican spotted owl habitat, meadows adjacent to riparian areas for Prebles western jumping mouse, and the lower end of the Trail Creek unit for Pawnee montane skipper habitat.

Post-Hayman changes were discussed with J. Peterson on 10/17/02. The biggest change as a result of the Hayman Fire was the burning of the potential Pawnee montane skipper habitat in the Trail Creek Unit (Trail Creek has since been dropped from the proposal). Another potential change is that areas of concentrated winter roosting habitat for bald

eagles around Cheesman Reservoir were lost in the Hayman Fire. It is not known where these eagles will winter now, and monitoring has been added to this proposal.

The draft Biological Evaluation was reviewed by J. Peterson and he concurred with the analysis and determinations made (10/25/02).

V. ANALYSIS OF EFFECTS – FEDERALLY LISTED AND PROPOSED SPECIES

The impacts associated with the thinning treatments and broadcast burning are the focal point of the discussion below. Although the creation of a structurally more diverse forest will positively affect the majority of wildlife species in the WAA, some temporary adverse effects may occur. These include the following: disturbances of foraging habitat during logging and burning, alteration of nesting habitats, etc. These are only temporary adverse effects; the long-term effects are anticipated to maintain or improve habitat for most species. The treatment areas encompass only a portion of the available habitat.

MAMMALS

Preble's Meadow Jumping Mouse (*Zapus hudsonius preblei*). This species was proposed for listing in 1997 and was listed as threatened in 1998. Critical habitat was designated in July 2002 (Federal Register, Vol. 67, no. 137). There were five areas in the Upper South Platte watershed identified as critical habitat; four of these are on the Pike-San Isabel National Forest. Unit SP14 includes portions of Trout Creek up to an elevation of 7600 feet. Specifically, it includes Trout Creek on the western 1/3 edge of the Ridgewood treatment unit.

This mouse is found in a variety of habitats but prefers low meadows for feeding (USFS 2000). The USFWS has identified habitat for this species as being mature plains riparian vegetation with relatively undisturbed grassland and a water source in close proximity. The project area ranges in elevation from 7600 to 9300 feet.

Decline of the Preble's meadow jumping mouse is linked to widespread habitat alteration, including conversion of grasslands to farms; livestock grazing; water development and management practices; and residential and commercial development (Fed. Reg., Vol 62, No. 571). Areas that are heavily grazed by livestock or are burned, especially during the warm season, reduce structural habitat diversity and reduce availability of food resources necessary for the buildup of fat reserves before winter hibernation.

Surveys were conducted in the general area in September 2000 and July 2001; there were twelve sites surveyed; five of the sites were located in the project area. Preble's meadow jumping mouse was found at four sites, none of which were located in the project area. Most of the Preble's meadow jumping mice were found on Trout Creek near Polhemus, which is to the north of the project area. In the summer of 2002, White Spruce Gulch, an intermittent drainage in the WAA, was surveyed for Preble's meadow jumping mouse and none were found (S. Tapia, USFS Biologist, pers. comm.).

Only one stand (stand 14 of the Ridgewood Unit) may be within 300 feet of the 100-year floodplain, although it is above 7,600 feet in elevation. Treatment in stand 14 will be modified to drop the lower portion of the stand that may be within 300 feet of the 100-year floodplain, so that no critical habitat is proposed for treatment under any of the project alternatives. In addition, all action alternatives have the indirect effect of reducing the potential for moderate or high intensity wildfire. The proposal and alternatives would not adversely modify any critical habitat. As a result, the determination for all alternatives for Preble's meadow jumping mouse is **"no effect."**

BIRDS

Bald Eagle (*Haliaeetus leucocephalus*). Breeding bald eagles are rare in Colorado. Although some nesting does occur, most eagles migrate in summer to northern breeding grounds but return to lower latitudes during the winter. Winter habitat for bald eagle consists of roost trees along rivers and other large bodies of ice-free water that allow access to fish (USFS 2000). Communal, nocturnal winter roosts have been found around Cheesman Reservoir, well to the north and outside of the WAA. Bald eagle roosts at that location were generally in large trees on hillsides within ¼ mile of Cheesman Reservoir. Much of the area around Cheesman burned in the 2002 Hayman Fire. Winter surveys (2002/03) around Cheesman Reservoir found that an unburned stand adjacent to the reservoir was being used by about 20 eagles (J. Peterson, USFWS, pers. comm., 1/22/03 and 3/24/03).

Several years ago there were incidental sightings in the winter around Manitou Lake (S. Tapia, District Biologist, pers. comm.). No communal, nocturnal roosts are found in the WAA. Currently, Manitou Lake has been drained for work on the dam and will not provide any winter habitat until it is refilled and fish become reestablished or are transplanted.

Only one unit is located adjacent to Manitou Lake (stand 29 of Long John Unit). This unit is not proposed for treatment under any of the alternatives, as it is dominated by grasses. Stand 28, which is the nearest forested stand proposed for treatment, is within ¼ mile of Manitou Lake and could be used for roosting by bald eagles. This stand is proposed for tractor yarding under all alternatives.

Mexican Spotted Owl (*Strix occidentalis lucida*). Historical records for the Mexican spotted owl in Colorado are very rare, and the historical distribution is very difficult to infer (Foster Wheeler 1999). This species was listed in 1993. Critical habitat was designated in 1995, but USFWS removed that designation in 1998. In 2001, critical habitat was re-designated. Critical habitat has been mapped for this species, but this mapping is currently being refined. The existing map identifies critical habitat (SRM-C-2) on the extreme north end of the Ridgewood Project Area, in Douglas County. Critical habitat was also identified in the extreme north end of the Trail Creek Area, but this area has been dropped from the proposal because it burned in Hayman Fire. Within SRM-C-2, there are two Protected Activity Centers (PACs): Thunder Butte and Devils Head.

The Thunder Butte PAC was burned over in the Hayman Fire, although much of the area was mapped as unburned on the BAER fire severity map. There are some areas within the critical habitat boundaries that do not, and cannot, support the primary constituent elements and are, by definition, not considered to be critical habitat, even though they are within the identified mapped boundaries (Fed. Reg.,Vol 66, No. 22, Feb 1, 2001).

For canyon habitat, the primary constituent elements include one or more of the following attributes: cooler and often more humid conditions than the surrounding area; clumps or stringers of trees and/or canyon wall containing crevices, ledges, or caves; high percent of dead litter and woody debris; and riparian or woody vegetation (USFWS 2001). Foraging habitat generally has more big logs, higher canopy closure, and greater densities of trees and snags than random sites (USFWS 1995). The Recovery Plan recommends managing foraging habitat through the coarse-filter method, managing the land within the range of what would happen with natural processes and disturbances.

Mexican spotted owl has been located on the Pikes Peak, South Platte, and San Carlos Ranger Districts on the Pike-San Isabel NF. Historic records include most of the Front Range. These include areas 10-20 miles to the southeast of the analysis area (CNHP 2001). The owl may be found on steep-sided canyons with old growth mixed conifer forests in southwestern Colorado. It may also be found in the shady, cool canyons of the pinyon-juniper zone. All nests in Colorado found to date occur on cliff ledges or in caves along canyon walls (UFSF 2000). These include both sheer, slick rock canyons with scattered patches of Douglas-fir and steep canyons with exposed bedrock cliffs, with various tiers of exposed rock at various heights.

The only area of potentially suitable habitat near the project area was Missouri Gulch. This area was visited in April 2002 by Forest Service and USFWS biologists. This drainage is wide, mostly forested, and has small, isolated rock outcrops rather than cliffs. This area was determined to be potential but very low-quality habitat. As a result of the field review, Missouri Gulch and Trail Creek areas are not considered to provide Mexican spotted owl habitat (J. Peterson, USFWS Biologist, pers. comm.). While the area is mapped as critical habitat, it does not have the primary constituent elements for canyon habitat, as identified above. In addition, all action alternatives have the indirect effect of reducing the potential for moderate to high intensity wildfires. Loss of habitat to wildfires was identified as one of the factors for listing this species (USFWS 1995). The

Recovery Plan also includes direction for management of foraging areas; these areas are to be managed to move towards historical conditions. All of the action alternatives do this to varying degrees. The proposed action or alternatives would not adversely modify any critical habitat. As a result, the determination for all alternatives for Mexican spotted owl is **"No effect."**

FISH

Greenback cutthroat trout *(Onchorynchus clarki stomias).* Historically, the greenback cutthroat trout was known to inhabit the Upper South Platte River. This species was believed to have been a common species historically. Habitat loss, habitat modification, and hybridization with or displacement by non-native trout species has eliminated greenbacks from most of its native range. Greenback trout are listed as threatened under the Endangered Species Act. This species is now restricted to only seven small drainages on the Pike and San Isabel NF (USFS 2000) but is not found in the project area. The determination for all alternatives for this species is **"no effect."**

INVERTEBRATES

Pawnee Montane Skipper *(Hesperia leonardus montana).* This species was listed as threatened in 1987. The skipper occurs only on the Pikes Peak Granite Formation in the South Platte River drainage system in Colorado. The total known habitat within the range of the species is estimated at 37.9 square miles (USFWS 1998). Surveys were conducted to the north of the WAA for the Two Forks Reservoir area. Those surveys found that much of the identified habitat was considered sub-optimal because of dense forest canopy cover and sparse ground cover (USFWS 2000).

The Pawnee montane skipper is found in sparsely wooded grasslands and open pine forests at elevations from 6,000 to 7,500 ft. The species is dependent on two plant species: the prairie gayfeather (*Liatris punctata*), which flowers late summer through early fall, and blue grama (*Bouteloua gracilis*). The butterfly uses prairie gayfeather for its nectar and the blue grama as larval plant food (USFWS 1998).

Recent conversations with Scott Ellis, who has conducted surveys to the north of the project area, resulted in the conclusion that Ellis' surveys were very thorough and that the existing map showing the upper elevational limit as 7500 ft is pretty accurate. Because the project area starts at 7600 ft, it likely does not provide suitable habitat for this species (L. Ellwood, USFWS Biologist, pers.comm.), although there may be potential habitat on the extreme north end in the Trail Creek area.

The Hayman Fire burned through Trail Creek in the area that had been identified as potential habitat. BAER fire severity mapping shows that most of this area burned in a low intensity fire. Based on the fact that the area burned as a low intensity fire and on results from studies in restoration treatments, understory vegetation (i.e., blue grama and gayfeather) should increase in a couple of years. There is the potential that this area could reburn in a future wildfire, but this is not a direct effect of the Proposed Action or alternatives.

Changes in butterfly abundance and distribution were monitored in restoration treatments in ponderosa pine forests in Arizona (Waltz and Covington 2001). Treatments included thinning trees to density levels comparable to Euro-American pre-settlement and re-introducing a low to medium intensity fire to the system. Butterfly and nectar plant richness and abundance were evaluated at one and three years after treatments. Butterfly species richness and abundance were two to three times greater in the treated units (years 1 and 3). Nectar plants richness ranged from two to ten times greater in restoration treatments (years 1 and 3).

All of the Trail Creek unit has been dropped from the proposal following the Hayman Fire. Since the rest of the WAA is outside of the range of the Pawnee montane skipper, none of the alternatives will have any affect on potential habitat. As a result, the determination for all alternatives for Pawnee montane skipper is **"no effect**."

NO ACTION WITH WILDFIRE

Bald Eagle. Some loss of incidental, daytime winter roost trees could occur with wildfires, depending on where and how the wildfire burned. Using the Hayman Fire as an example, about 45% of the fire burned at moderate or high intensity and was stand-replacement level. If stands around Manitou Lake burned in a stand replacement fire, it could result in a loss of roosting habitat. However, no activities are proposed in this alternative and implementation of this alternative would result in a determination of **"no effect**."

PROPOSED ACTION, ALTERNATIVES A, B, C, and D.

Bald Eagle. Under these alternatives, stand 28, which is within ¼ mile of Manitou Lake, would be treated. This unit would be tractor yarded, to thin overstory and understory. Yarding occurring in the winter could cause disturbance and displacement of bald eagles that may roost in the area. This unit is within the one-mile buffer zone from urban interface, and landings or piles would be jackpot burned; there would be no broadcast burning. The resultant stand would still provide suitable roosting habitat after completion of the treatments.

Mitigation has been incorporated into all alternatives. Since known winter roosts around Cheesman Reservoir burned in the Hayman Fire, it is not known where these recently displaced eagles will spend future winters. Winter surveys (2002/03) around Cheesman Reservoir found that an unburned stand adjacent to the reservoir was being used by about 20 eagles (J. Peterson, USFWS, pers. comm., 1/22/03 and 3/24/03). After Manitou Lake is re-filled, it would be monitored for two winters from December through February for concentrated use by bald eagles for nocturnal roosting. If roosts are found, a 1/8-mile radius "no forest management" protection zone would be applied, as well as a restriction of work activities within a one-mile radius during the period November 1 to March 30. Implementation of any of these alternative would result in a determination of **"May Effect – not likely to adversely affect**."

ALTERNATIVE E

Bald Eagle. This alternative would have similar thinning and understory treatments as the other alternatives, but would also include creation of harvest openings on about 7,900 acres. Some of these openings would be recommended for maintenance over time, and could be located around Manitou Lake. This alternative would also include harvest within the riparian buffer in the stand.

Mitigation has been incorporated into all alternatives. Since known winter roosts around Cheesman Reservoir burned in the Hayman Fire, it is not known where these recently displaced eagles will spend future winters. After Manitou Lake is re-filled, it would be monitored for two winters from December through February for concentrated use by bald eagles for nocturnal roosting. If roosts are found, a 1/8-mile radius "no forest management" protection zone would be applied, as well as a restriction of work activities within a one-mile radius during the period November 1 to March 30. Implementation of this alternative would result in a determination of **"May Effect – not likely to adversely affect**."

CUMULATIVE EFFECTS

Under the Endangered Species Act, only future state, tribal, or private actions that are reasonably certain to occur are considered. Future federal actions that are unrelated to this proposal would require separate consultation.

Bald Eagle. Manitou Lake is within ¼ mile of Highway 67, but no actions are proposed at this time. Otherwise, the land around Manitou Lake is in public ownership. Recreational use around Manitou Lake could cause disturbance or displacement to roosting bald eagles in the winter. Generally the gate into the Picnic Area is closed during winter months, but walk-in use could occur. Any future changes in recreation management around Manitou Lake would go thru the NEPA process and would undergo consultation if needed.

VI. ANALYSIS OF EFFECTS – SENSITIVE SPECIES

Information on vertebrate and invertebrate sensitive species occurrence was gathered from the statewide Natural Diversity Information Source (NDIS) database, the Colorado Natural Heritage database, and from information provided by the Pike and San Isabel NF (USFS 2000). Information was also compiled from *Mammals of Colorado* (Fitzgerald et al. 1994) and the *Colorado Breeding Bird Atlas* (Kingery 1998) and other sources, as referenced.

Many of the species are not expected to be present in the project area and will not be analyzed, as shown in Table 4. Information on these species, and rationale for dropping them is found in Section XI.

BIRDS

Northern Goshawk *(Accipiter gentilis).* The first records of the northern goshawk distribution in the Front Range date back to 1873. Goshawks typically reuse the same nesting territory year after year. Since they reuse established areas, they have been affected by historic and current logging operations. The goshawk populations seem to be declining today (Foster Wheeler 1999).

The northern goshawk is a resident in wooded areas of foothills and mountains up to treeline and generally only occurs in lower elevations during migration and winter. The hawk prefers mature stands of coniferous or deciduous woodlands with high canopy closure for breeding and open understories for foraging. Nesting occurs near wooded areas with openings and water.

Goshawks reuse the same territory year after year and sometimes reuse the same nest. Pairs typically have one or more alternate nests within the territory (Kingery 1998). Mistletoe brooms may be used for support for nests.

Potential habitat for the northern goshawk occurs across the project area. There are four known historic goshawk nesting territories in the project vicinity, two of which are in the treatment units. The Forest is managing under goshawk management guidelines that restrict activities in 30-acre and 600-acre areas around known nests. There is a 30-acre no activity and no cut buffer from March 15 to September 15. In addition there is a 600-acre buffer that protects feeding areas. These and any new nests will have these buffers applied to them. There is also a mitigation measure that requires pre-implementation surveys and mitigation where nests are found.

Flammulated Owl *(Otus flammeolus).* This owl was believed by early settlers to be one of the most rare predatory birds in Colorado, or even the United States. Recent studies conclude that these owls are one of the most prolific birds of prey in some areas. The mistake of early naturalists could be due to the secretive nature of this owl. It is unknown whether or not populations declined and then rebounded or have always been abundant.

Their habitats have declined as a result of fire suppression and closure of understories (Foster Wheeler 1999).

Flammulated owls are associated with mature to old growth ponderosa pine/Douglas-fir forests along the Rocky Mountains. They are secondary cavity nesters and depend on woodpeckers for creating nesting cavities. This species is insectivorous and migratory, spending the winters in Mexico and Central America. NDIS records show that this species is known to occur in all three counties in the project area. The *Colorado Breeding Bird Atlas* shows confirmed breeding across the western half of the state.

There has been a 20-year study of flammulated owls going on at Manitou Experiment Station, which is in the center of the project area. Linkhart (2001) determined that habitat quality was determined by two primary factors. First, cavity-tree availability determined where owls established territories. Territories had a mean of 7.7 cavity trees (1.5 cavity trees/acre). Second, forest type and structure determine whether a territory was occupied by breeding pairs or by bachelor males. Productivity was positively correlated with territory area in ponderosa pine/Douglas-fir forests and with greater crown cover in the second largest (33.0-48.2 cm) of the four tree-diameter categories (13-19" dbh).

Reynolds and Linkhart (1992) compared forest types used to availability at the Manitou Research Station. They found that flammulated owls used old growth ponderosa pine/Douglas fir more than was available, and used Douglas-fir/blue spruce less than was available. Mature blue spruce/aspen and mature aspen were used similar to availability.

Wright (1992) studied habitat use of flammulated owls in southwestern Montana. She found that they responded to the presence of snags and large trees at the microhabitat scale, presence of openings at the home range scale, and the overall abundance of low/moderate canopy cover (70%) ponderosa pine/Douglas-fir forests at the broadest scale. She also found owls in half of her plots that were in selectively logged stands (with large residual trees and snags).

Use of the old ponderosa pine/Douglas-fir forests likely involves habitat composition and structure and high prey availability. This species is an obligate secondary cavity nester, and older forests typically contain an abundance of snags and lightening-damaged trees with cavities. The interior canopy of large, old trees is often open, with large exposed limbs that provide perches. Old ponderosa pine forests typically form open stands with well-developed grass and shrub understories. These understories support arthropods that are used by fledged owlets and molting adults in late summer. The openness of the stands also provides space for foraging aerially.

Linkhart (1984) found that foraging was concentrated in one to four intensive foraging areas (IFAs) averaging about one hectare per range. The IFA nearest to the nest was used during peak feeding times, at dawn and dusk. Twelve of the 15 IFAs studied were associated with mature, mostly open patches of ponderosa pine mixed with Douglas-fir on mid-slopes and ridgetops, and had exposures of 90 to 270 degrees (in GTR-RM-253, p.24).

Lewis' Woodpecker *(Melanerpes lewis).* Lewis' woodpecker is a year-round resident of the foothills of southern Colorado and occurs in lowland and foothill riparian areas, agricultural areas, and urban areas with tall deciduous trees. It is known to occur in the Wet Mountains and in Custer and Pueblo counties (USFS 2000). NDIS lists this species as present in all three counties in the project area.

Lewis' woodpeckers feed almost exclusively on emergent insects and specialize in flycatching in open habitats. These include open pine forests, burned areas, riparian and rural cottonwoods, and pinyon/juniper woodlands. Current distribution of this species may have changed due to lack of open ponderosa pine stands and colonization of cottonwood stands as they expanded along the Arkansas River (Kingery 1998).

Three-Toed Woodpecker *(Picoides tridactylus).* The three-toed woodpecker occurs in coniferous forests of high mountains, primarily in mature or old growth spruce-fir. It may also occur in ponderosa pine, Douglas-fir, and lodgepole pine vegetation types. The woodpecker is associated with snag abundance and insect outbreaks as a result of disease or fire (USFS 2000). Wood-boring insect larvae and pupae extracted from beneath the bark of trees constitute the main part of their diet.

An 1897 description of the distribution of this species stated that the woodpecker was not common in any area, but scattered throughout the mountains of Colorado. The current distribution and populations are expected to be similar to what they were in the late 1800s (Foster Wheeler 1999). Fire suppression has resulted in few available burned areas but has also led to favorable conditions for increases in wood-boring insect populations (Kingery 1998).

The Hayman Fire burned trees over a large area. Insects are already moving into these dead or stressed trees (B. Post, Forester, pers. comm., 9/26/02) and are expected to increase in the area over the next few years. Generally, insect use will continue until the bark starts to fall off the trees (about three years). Because there may be some delayed mortality, this period of increased insect use could continue over a longer period. This increase in insect activity will increase foraging habitat for three-toed woodpeckers.

Pygmy Nuthatch *(Sitta pygmaea).* The pygmy nuthatch is a foothills resident of the lower mountains along the Front Range. It is primarily found in ponderosa pine and aspen forest. The nuthatch requires cavities for nesting (USFS 2000). The pygmy nuthatch is known to occur in the project area (NDIS; Kingery 1998).

This species shows a strong affinity for ponderosa pine habitats. They excavate their own cavities and need mature ponderosas with old or decayed wood. The ideal habitat consists of park-like, open forests of tall ponderosa pines, where the pines have broken-off stubs of branches or treetops. In the winter they form flocks, and roost communally.

In the breeding season, numbers may increase as a result of use of nest boxes. Their numbers increased more where there were fewer snags, indicating that a lack of snags could limit their numbers (Kingery 1998).

Historical data on populations is not available, but due to their strong tie with mature ponderosa pine forests, it is assumed that populations can be correlated with the abundance of mature ponderosa pine stands.

Golden-Crowned Kinglet *(Regulus satrapa)*. This bird is a summer resident of high mountains but moves to lower elevations in the winter. It breeds primarily in mature, dense spruce-fir forests but uses other vegetation types including Douglas-fir and ponderosa pine in the winter. The golden-crowned kinglet appears to be more common west of the Continental Divide than east.

This species is known to occur in all three counties of the project area (NDIS). The *Breeding Bird Atlas* shows probable or confirmed breeding in the project area and this species is expected to be present.

Because this species is found in dense, old coniferous forests, it is assumed that this bird experienced a population decline around 1900 due to intense logging and mining activities. It is also assumed that around the 1950s their populations recovered due to fire suppression, which allowed forests to grow denser, providing habitat for the kinglet (Foster Wheeler 1999).

Fox Sparrow *(Passerella iliaca)*. The Rocky Mountain form is a summer resident in the mountains where it uses riparian willow shrublands and wet meadows with willows. The fox sparrow also uses forest undergrowth, woodland thickets, and montane brushland. It is less common east of the Continental Divide. The Rusty form is a rare spring and fall migrant on the eastern plains where it uses lowland riparian shrublands (USFS 2000).

NDIS information states that this species is present in all three counties, and the *Breeding Bird Atlas* shows confirmed breeding in the project vicinity (Kingery 1998). However, they show lower numbers on the eastern slope because of the lack of suitable willow habitats, and the steep stream canyons. They are associated with dense shrubby understory near watercourses.

AMPHIBIANS

Tiger Salamander *(Ambystoma tigrinum)*. The tiger salamander occurs throughout Colorado at elevations up to 12,000 feet. It occurs in virtually any habitat where there is a body of non-flowing water nearby for breeding. Tiger salamanders inhabit ponds, lakes and reservoirs, glacial kettle ponds, and beaver ponds. The species is usually absent from waters inhabited by predatory fishes, bullfrogs, turtles, and crayfish (USFS 2000).

NDIS lists this species as known to occur, and common, in all three counties in the project area. Adults are found in virtually any habitat, providing there is a terrestrial substrate suitable for burrowing and a body of water nearby suitable for breeding (Maxell 2000). Terrestrial adults usually remain underground in self-made burrows or in those made by rodents or other animals. Breeding takes place soon after snowmelt; breeding habitat range from clear mountain ponds to temporary, manure-polluted pools in the lowlands, but these sites usually lack predatory fish.

Population status in the Rocky Mountains is unknown (Maxell 2000). Potential risk factors include grazing, non-indigenous species, use as bait species, road and trail development, vehicle use, water impoundments, and habitat fragmentation.

Northern Leopard Frog *(Rana pipiens).* The Northern leopard frog occurs throughout Colorado, except in the Republican River drainage and southeastern Colorado, south of the Arkansas River. It can range up to 11,000 feet in elevation, and inhabits the banks and shallow portions of marshes, ponds, lakes, reservoirs, beaver ponds, streams, and other bodies of permanent water. The frog appears to be especially associated with rooted aquatic vegetation (USFS 2000).

Corn and Fogleman (1984) reviewed local extinctions in Larimer County, Colorado. In their study, several of the populations that failed were affected by severe drought and breeding ponds had dried up. Other populations failed due to other, unknown causes.

There have been no formal surveys for this species (G. Skiba, CDOW, pers. com.) but this species has been reported in Trout Creek in the project area (P. Gallagher, Fisheries Biologist, USFS, pers. comm.). Charles Loffler (retired CDOW) determined that there is potential habitat for this species in Hotel Gulch (S. Tapia, Wildlife Biologist, pers. comm.). The NDIS database indicates that there are occurrences in Teller County, but there is no information on abundance.

VII. COMPARISON OF ALTERNATIVES

Species to be Carried Forward

Both the tiger salamander and northern leopard frogs have the potential to be affected by similar actions. Effects on these species will be analyzed together.

Because both the flammulated owl and Lewis' woodpecker use more open stands they will be analyzed together. Three-toed woodpeckers and golden crowned kinglets both use denser stands of Douglas-fir and ponderosa pine. These two species will be analyzed together.

Table 5 lists the sensitive species that will be carried forward for analysis. The table also shows the seasonal or habitat components that may be affected by the proposal.

Table 5. Sensitive Species to be Carried Forward into Effects Analysis

Species	Seasonal habitat components to be analyzed
Northern Goshawk	Nesting and foraging habitat in forested stands
Flammulated Owl Lewis' Woodpecker	Nesting, roosting, and foraging habitat in open forested stands
Three-Toed Woodpecker Golden Crowned Kinglet	Nesting and foraging in forested stands (primarily winter habitat for golden-crowned kinglets)
Pygmy Nuthatch	Nesting and foraging in mature ponderosa pine
Fox Sparrow	Summer habitat in shrubby riparian habitats
Tiger Salamander Northern Leopard Frog	Sedimentation of bodies of non-flowing or ponded water that may be used for breeding or over-winter ponds. Roads, habitat fragmentation, and wildfire.

NO ACTION WITH WILDFIRE

There is a high potential for wildfire in the WAA within the next 10 years. If this occurs, expected changes in forested habitats are shown below. It is predicted that there could be four 10,400-acre stand-replacing fires in the Trout and West Creek watersheds. Because the WAA is about half of the Trout and West Creek watersheds, this means there could be two wildfires in the WAA. Table 6 shows an estimate of what canopy closures could be after a wildfire in the WAA.

Table 6. Canopy Closures under No Action, with Wildfire

Forested cover classes	Acres	*Percent*
0-10% canopy closure	27,742	36%
11-40% canopy closure	5,974	8%
41-70% canopy closure	32,077	41%
71-100% canopy closure	6,599	8%

Table 7 describes the effects of potential wildfire in the WAA on Sensitive species, given the canopy closures identified above in Table 6.

Table 7. Effects of No Action Assuming Wildfire Occurs

Sensitive Species	Habitat conditions
Northern Goshawk	The habitat capability for this species rated 70% after the Hayman Fire. Depending on how and where (in relation to nest areas) a wildfire burned, nest stands may be lost, but foraging habitat could be improved. Because 68% of the WAA would remain in 41-100% canopy cover, no measurable changes in goshawk populations would be expected until a wildfire occurs. Nest stands could be lost in a wildfire, depending on location and intensity. The No Action alternative ranks the highest for maintaining goshawk habitat (without wildfire).
Flammulated Owl Lewis' Woodpecker	About 27% of the WAA would be affected by wildfire, and about half of this would be expected to be stand-replacing wildfire. Nesting habitat for these species would be lost in those areas for many decades. Depending on how and where (in relation to nest areas) a wildfire burned, nest trees and territories may be lost, but foraging habitat could be improved. Under the No Action alternative, about 66% of the WAA would be in forested stands with 11-70% canopy cover and the habitat capability came out at 30%.
Three-Toed Woodpecker Golden-Crowned Kinglet	These species use denser stands, generally in the 41-100% canopy cover classes. About 68% of the WAA would be in this category. In addition, wood-boring and bark beetles would be expected to increase in burned areas and would provide prey for the three-toed woodpecker. However, this increase in foraging habitat would be transitory (around three years after burning or until the bark starts to fall off). The No Action alternative ranks the highest for maintaining habitat for these species.
Pygmy Nuthatch	Since this species uses mature ponderosa pine stands, a wildfire (if stand-replacing) would probably eliminate suitable nesting and foraging habitat. This alternative could result in an additional 10,500-acre loss of mature stands, and the No Action alternative ranks last for maintaining habitat for this species. Wildfires could burn anytime from June thru September, depending on conditions; early wildfires could result in a loss of nests or nestlings.
Fox Sparrow	No treatments are proposed in the No Action alternative, but riparian shrub habitats could be affected by stand-replacing wildfire. This alternative has the highest potential for stand-replacing wildfire and it ranks next to last in maintaining habitat for this species. Wildfires could burn anytime from June thru September, depending on conditions; early wildfires could result in a loss of nests or nestlings.
Tiger Salamander Northern Leopard Frog	High road and motorized trail densities provide potential for roadkill mortality, especially where roads are adjacent to stream and pond habitats. Current understory conditions provide somewhat cooler and moister conditions that what occurred historically, and habitat fragmentation is reduced. The No Action alternative is similar to Alternatives D and E in generating high amounts of accelerated sediment delivery into the drainages. The potential for moderate to high intensity wildfire is highest under this alternative. Fast-moving, intense wildfire has the potential to impact slow-moving amphibians, especially adult salamanders that may be found in the uplands during summer and fall, when wildfires are most likely to occur.

ACTION ALTERNATIVES

All of the action alternatives have an indirect effect on the risk of wildfire in the WAA. They create a short-term loss of habitat and may cause displacement of some species. However, the negative short-term effects are outweighed by positive long-term effects, which include creation, improvement and enhancement of habitat, and reduction of the risk of stand-replacing wildfire. The alternatives vary in how much habitat would be affected and the resultant risk of wildfire. Effects for each action alternative are shown below.

PROPOSED ACTION

The Proposed Action proposes to treat around 20,170 acres of ponderosa pine and Douglas-fir stands in six treatment units. Around 18,000 of the acres would be heavier mechanical treatments, using tractor, helicopter, and cable systems. Around 2,000 acres would be lighter treatments. None of the treatments would occur in the 71-100% canopy closure class. Expected canopy cover class following treatment is shown below in Table 8.

Table 8. Canopy Closures After Implementation of Proposed Action

Forested cover classes	Acres	Percent
0-10% canopy closure	17,242	22%
11-40% canopy closure	25,339	33%
41-70% canopy closure	21,637	28%
71-100% canopy closure	8,174	11%

An indirect effect of the proposed treatments is the reduced risk of wildfire. However, there is still a risk of wildfire. If wildfires burned after treatments as described in the EIS, the results would be as shown below.

Table 9. Canopy Closures After Implementation of Proposed Action with Wildfire

Forested cover classes	Acres	Percent
0-10% canopy closure	19,867	26%
11-40% canopy closure	24,131	31%
41-70% canopy closure	20,613	26%
71-100% canopy closure	7,386	10%

This alternative proposes some level of treatment over about 26% of the WAA. Effects of the Proposed Action on Sensitive species are discussed in Table 10.

Table 10. Effects on Sensitive Species with Implementation of Proposed Action

Sensitive Species	Habitat conditions
Northern Goshawk	In this alternative, stands with canopy closure greater than 70% will not be treated (retained as thermal cover). This will leave areas suitable for nesting, with foraging habitat adjacent to the nest stands. However, stands in the 41-70% canopy cover class would be treated. About 36% of the WAA would be in 41-100% canopy cover, but an additional 26% of the area would be treated with mitigation that should maintain use in existing territories. This proposal is using Forest direction to apply nest and feeding area buffers around known nest territories. This should maintain suitability for pairs returning to the same nest territories. Overall, about 62% of the WAA could provide habitat. The HABCAP rated this alternative as having 80% habitat capability, a decrease from the No Action (but did not incorporate mitigation). This alternative ranks second (along with Alternatives A and C) for maintaining goshawk habitat.
Flammulated Owl Lewis' Woodpecker	In this alternative, about 33% of the WAA would be treated or affected by wildfire (26% by treatments and 7% by wildfire). In this alternative, most of the treatments are in stands in the 40-70% canopy cover class and will move stands into the 11-40% canopy cover class. 57% of the WAA would be in stands of 11-70% canopy cover. Mitigation includes retention of snags and trees with cavities. The HABCAP model did not detect any difference between the No Action and Proposed Action for Lewis' woodpeckers. However, this alternative is more beneficial as treatments will maintain suitability for use by these species, whereas wildfire would reduce suitability over the long term. This alternative ranks the highest of the action alternatives for maintaining habitat for these species.
Three-Toed Woodpecker Golden-Crowned Kinglet	These species use denser stands, generally in the 41-100% canopy cover classes. About 36% of the WAA would be in this category. In addition, wood-boring and bark beetles would be expected to increase in burned areas and would provide prey for the three-toed woodpecker. However, this increase in foraging habitat would be transitory (around three years after burning or until the bark starts to fall off). This alternative ranks third (along with Alternatives A and C) for maintaining habitat for these species. As this alternative would move the area towards conditions that are closer to what stands would be like under natural conditions, trees would be more vigorous and less susceptible to insects and disease. Foraging habitat would decrease over current conditions, but snag habitat would be maintained.
Pygmy Nuthatch	The HABCAP model does not predict a change in habitat capability under any of the alternatives with treatments. Thinned stands would still provide habitat. Older, larger-diameter trees would be retained, as well as all existing trees with cavities, snags, and lightening-struck trees. Species using low-elevation mixed conifer stands generally begin nesting in April (based on information from *Birds of North America*). Eggs and nestlings would be vulnerable to loss through mechanical treatments from early April through July. Treatments would be spread out over 10 years; not all treatment would occur during the breeding season and effects would be short-term. Since this species uses mature ponderosa pine stands, a wildfire (if stand-replacing) would reduce suitable nesting and foraging habitat. This alternative could result in an additional 2,625-acre loss of mature stands, and this alternative ranks first (along with Alternatives A, C and E) for maintaining habitat for this species.

Sensitive Species	Habitat conditions
Fox Sparrow	This alternative includes a riparian buffer that would maintain shrub riparian habitats during treatments. It also has a low percent chance of wildfire (7% of WAA), and this alternative rates highest (along with Alternatives A and C) for maintaining habitat for this species.
Tiger Salamander Northern Leopard Frog	This alternative would rehabilitate 48 miles of existing roads and trails, and reduce risk from roadkill mortality. This alternative includes a 100' riparian buffer, which would maintain habitats adjacent to the riparian zone. Vegetation treatments would open up the upland stands, making them somewhat warmer and drier; however, the canopy is denser than what is believed to have occurred historically. Thermal cover patches will be retained and will provide somewhat cooler and moister understory conditions. This alternative produces the lowest amount of predicted accelerated sediment delivery to Trout and West Creeks. Broadcast burning, which would occur in the spring or fall, would be low-intensity fires. Adult salamanders that may be found in the uplands would largely be under the duff/needle layer, under rocks or logs or other areas where it is cool and moist. Because of the low intensity of the burning, these features would not be affected and most adult salamanders would not be killed.

Alternative A.

The long-term effects of this alternative would be similar to the effects of the Proposed Action. Vegetation outcomes are the same; however, this alternative uses mechanical methods to reduce understory fuels instead of broadcast burning as proposed in the Proposed Action.

The difference in this is that mechanical methods could occur at any time during the year when soil is frozen or dry (unless in a calving or fawning area or area with another seasonal restriction), while broadcast burning could occur from March to April or September to October. Table 11 describes the effects of Alternative A on Sensitive species.

Table 11. Effects of Alternative A on Sensitive Species

Sensitive Species	Habitat conditions
Northern Goshawk	Since mitigation restricts activities around nests, effects of this alternative are similar to the Proposed Action.
Flammulated Owl Lewis Woodpecker	Effects of this alternative are similar to the Proposed Action. Because mechanical treatments are more controlled, the potential for loss of designated snags and leave trees is very low.
Three-Toed Woodpecker Golden-Crowned Kinglet	There should be little difference between mechanical or broadcast burning to reduce fuels. Because mechanical treatments are more controlled, the potential for loss of designated snags and leave trees is very low. Effects would be the same as Proposed Action. The HABCAP model did not predict a change in habitat capability with this alternative. See No Action.
Pygmy Nuthatch	Because mechanical treatments are more controlled, the potential for loss of designated snags and leave trees is very low. The HABCAP model did not predict a change in habitat capability with this alternative. See No Action.

Fox Sparrow	Dense shrubby understory near watercourses would be expected to remain unchanged. This alternative includes mitigation in the streamside management zone.
Tiger Salamander Northern Leopard Frog	This alternative would rehabilitate 48 miles of existing roads and trails, and reduce risk from roadkill mortality. This alternative includes a 100' riparian buffer, which would maintain habitats adjacent to the riparian zone. Vegetation treatments would open up the upland stands, making them somewhat warmer and drier; however, the canopy is above what is believed to have occurred historically. Thermal cover patches will be retained and will provide somewhat cooler and moister understory conditions. This alternative produces the second lowest amount of sediment in Trout and West Creeks. This alternative does not include any broadcast burning and adult salamanders in the uplands would not be affected by burning.

Alternative B.

Under this alternative, forested stands in the WAA would move more slowly towards more open stands. Table 12 shows the canopy cover class distribution of forested stands following treatments.

Table 12. Canopy Cover Classes, Alternative B, following treatments

Canopy cover class	Acres	Percent
0-10%	17,242	22%
11-40%	19,809	25%
41-70%	27,167	35%
71-100%	8,174	11%

Since this alternative would treat fewer acres, the risk of wildfire is higher than the Proposed Action. Assuming the wildfires happen as outlined, canopy cover classes would be as shown in Table 13.

Table 13. Canopy Cover Classes, following treatments and wildfire

Canopy cover class	Acres	Percent
0-10%	22,492	29%
11-40%	17,919	23%
41-70%	24,542	31%
71-100%	7,439	10%

This alternative includes ground-based and helicopter yarding, but only generally allows burning of piles, no broadcast burning. This alternative proposed treatment over 17% of the WAA. Table 14 describes effects of Alternative B on Sensitive species.

Table 14. Effects of Alternative B on Sensitive Species

Sensitive Species	Habitat conditions
Northern Goshawk	Stands with canopy closure greater than 70% will not be treated (retained as thermal cover). This will leave areas suitable for nesting, with foraging habitat adjacent to the nest stands. However, stands in the 41-70% canopy cover class would be treated. About 42% of the WAA would be in 41-100% canopy cover, but an additional 17% of the area would be treated with mitigation that should maintain use in existing territories. The Forest has direction to apply nest and feeding area buffers around known nest territories. This should maintain suitability for pairs returning to the same nest territories. Overall, about 59% of the WAA could provide habitat. This alternative ranks third (along with E) for maintaining goshawk habitat. Since the HABCAP model predicted a 6% decrease in habitat capability between the No Action and the Proposed Action, this alternative would have about a 3% decrease, still well above Forest Plan Standards & Guidelines.
Flammulated Owl Lewis' Woodpecker	In this alternative, most of the treatments are in stands in the 40-70% canopy cover class and will move stands into the 11-40% canopy cover class. All snags and trees with cavities will be retained. Habitat capability for this species should be improved under this alternative, but to a lesser degree than the Proposed Action. About 31% of the WAA would be affected by treatments or wildfire, 17% by treatments and 14% by wildfire. Under this alternative, about 55% of the WAA is in forested stands with 11-70% canopy cover. This alternative ranks fourth of the action alternatives for maintaining habitat for flammulated owls.
Three-Toed Woodpecker Golden-Crowned Kinglet	These species use denser stands, generally in the 41-100% canopy cover classes. About 42% of the WAA would be in this category. In addition, wood-boring and bark beetles would be expected to increase in burned areas and would provide prey for the three-toed woodpecker. However, this increase in foraging habitat would be transitory (around three years after burning or until the bark starts to fall off). This alternative ranks second (along with Alternative D) for maintaining habitat for these species.
Pygmy Nuthatch	The HABCAP model does not predict a change in habitat capability under any of the alternatives with treatments. Thinned stands would still provide habitat. Older, larger-diameter trees would be retained, as well as all existing trees with cavities, snags, and lightening-struck trees. Species using low-elevation mixed conifer stands generally begin nesting in April (based on information from *Birds of North America*). Eggs and nestlings would be vulnerable to loss through mechanical treatments from early April through July. Treatments would be spread out over 10 years; not all treatment would occur during the breeding season and effects would be short-term. Since this species uses mature ponderosa pine stands, a wildfire (if stand-replacing) would reduce suitable nesting and foraging habitat. This alternative could result in a loss of 5,250 acres of mature stands, and this alternative ranks second for maintaining habitat for this species.
Fox Sparrow	This alternative includes a riparian buffer that would maintain shrub riparian habitats during treatments. It also has a low percent chance of wildfire (14% of WAA), and this alternative rates second for maintaining habitat for this species.

Sensitive Species	Habitat conditions
Tiger Salamander Northern Leopard Frog	This alternative would rehabilitate 31 miles of existing roads and trails, and reduce risk from roadkill mortality. This alternative includes a 100' riparian buffer, which would maintain habitats adjacent to the riparian zone. Vegetation treatments would open up the upland stands, making them somewhat warmer and drier; however, the canopy is above what is believed to have occurred historically. Thermal cover patches will be retained and will provide somewhat cooler and moister understory conditions. This alternative produces the third lowest amount of sediment to Trout and West Creeks. This alternative includes no broadcast burning and adult salamanders in the uplands would not be affected.

Alternative C.

This alternative is very similar to the Proposed Action, since it includes the same thinning and burning prescription. Alternative C eliminates any impact from new temporary roads, but still rehabilitates 48 miles of unclassified roads following treatment. Alternative C includes more helicopter yarding, which may increase short-term disturbance, but would also reduce the duration of the disturbance. It would also decrease ground disturbance and reduce the potential for affects to species like tiger salamander.

Alternative D.

Under this alternative, forested stands in the WAA would move only minimally towards more open stands. Table 16 shows the canopy cover class distribution of forested stands following treatments.

Table 16. Canopy cover classes after implementation of Alternative D

Canopy cover class	Acres	Percent
0-10%	17,242	22%
11-40%	13,489	17%
41-70%	33,487	43%
71-100%	8,174	11%

This alternative treats only 6,750 acres out of the 77,000-acre WAA; there would be change over only 9% of the WAA. Because of the small amount of area treated, the potential for wildfire is higher than under the Proposed Action. Following the wildfire scenario used for this analysis, canopy cover would be distributed as shown below in Table 17.

Table 17. Canopy cover classes for Alternative D and wildfire

Canopy cover class	Acres	Percent
0-10%	26,692	34%
11-40%	11,221	14%
41-70%	27,722	36%
71-100%	6,756	9%

Table 18 describes the effects of Alternative D on Sensitive species.

Table 18. Effects of Alternative D on Sensitive Species

Sensitive Species	Habitat conditions
Northern Goshawk	Stands with canopy closure greater than 70% will not be treated (retained as thermal cover). This will leave areas suitable for nesting, with foraging habitat adjacent to the nest stands. However, stands in the 41-70% canopy cover class would be treated. About 45% of the WAA would be in 41-100% canopy cover, but an additional 9% of the area would be treated with mitigation that should maintain use in existing territories. The Forest has direction to apply nest and feeding area buffers around known nest territories. This should maintain suitability for pairs returning to the same nest territories. Overall, about 54% of the WAA could provide habitat. This alternative ranks lowest for maintaining goshawk habitat. Since the HABCAP model predicted a 6% decrease in habitat capability between the No Action and the Proposed Action, this alternative would have about a 1% decrease, still well above Forest Plan S & G's.
Flammulated Owl Lewis' Woodpecker	In this alternative, most of the treatments are in stands in the 40-70% canopy cover class and will move stands into the 11-40% canopy cover class. About 50% of the WAA would be in forested stands with 11-70% canopy cover. All snags and trees with cavities will be retained. Habitat capability for this species should be improved under this alternative, but to a lesser degree than the Proposed Action. About 33% of the WAA would be affected by treatments or wildfire, 9% by treatments and 24% by wildfire. This alternative ranks the lowest of the action alternatives for maintaining habitat for flammulated owls and is comparable to No Action.
Three-Toed Woodpecker Golden-Crowned Kinglet	These species use denser stands; generally in the 41-100% canopy cover classes. About 45% of the WAA would be in this category. In addition, wood-boring and bark beetles would be expected to increase in burned areas and would provide prey for the three-toed woodpecker. However, this increase in foraging habitat would be transitory (around three years after burning or until the bark starts to fall off). This alternative ranks second (along with Alternative B) for maintaining habitat for these species.
Pygmy Nuthatch	The HABCAP model does not predict a change in habitat capability under any of the alternatives with treatments. Thinned stands would still provide habitat. Older, larger-diameter trees would be retained, as well as all existing trees with cavities, snags, and lightening-struck trees. Habitat would be lost in the persistent openings. Species using low-elevation mixed conifer stands generally begin nesting in April (based on information from *Birds of North America*). Eggs and nestlings would be vulnerable to loss through mechanical treatments from early April through July. Treatments would be spread out over 10 years; not all treatment would occur during the breeding season and effects would be short-term. Since this species uses mature ponderosa pine stands, a wildfire (if stand-replacing) would reduce suitable nesting and foraging habitat. This alternative could result in a loss of 9,450 acres of mature stands, and this alternative ranks third for maintaining habitat for this species.

Sensitive Species	Habitat conditions
Fox Sparrow	This alternative includes a riparian buffer that would maintain shrub riparian habitats during treatments. It also has a moderate chance of wildfire (24% of WAA), and this alternative ranks low (along No Action) for maintaining habitat for this species.
Tiger Salamander Northern Leopard Frog	This alternative would rehabilitate only 13 miles of existing roads and trails and reduce risk from roadkill mortality. This alternative includes a 100' riparian buffer, which would maintain habitats adjacent to the riparian zone. Vegetation treatments would open up the upland stands, making them somewhat warmer and drier; however, the canopy is above what is believed to have occurred historically. Thermal cover patches will be retained and will provide somewhat cooler and moister understory conditions. This alternative produces the second highest amount of sediment in Trout and West Creeks, above amounts predicted under No Action. Broadcast burning, which would occur in the spring or fall, would be low-intensity fires. Adult salamanders that may be found in the uplands would largely be under the duff/needle layer, under rocks or logs or other areas where it is cool and moist. Because of the low intensity of the burning, these features would not be affected and most adult salamanders would not be killed.

Alternative E.

This alternative is the most aggressive at moving towards more open stands. Table 19 shows the canopy cover class distribution of forested stands following treatments.

Table 19. Canopy Cover Classes After Implementation of Alternative E

Canopy cover class	Acres	Percent
0-10%	25,142	32%
11-40%	25,759	33%
41-70%	17,791	23%
71-100%	3,700	5%

This alternative is more aggressive at moving towards more open stands. It proposes treatment over 34% of the WAA. There is still a risk of wildfire and canopy cover class would be as shown in Table 20, below.

Table 20. Canopy Cover Classes: Alternative E, with Wildfire

Canopy cover class	Acres	Percent
0-10%	27,767	37%
11-40%	22,871	29%
41-70%	16,793	22%
71-100%	3,490	5%

Table 21 summarizes the effects of Alternative E on Sensitive species.

Table 21. Alternative E

Sensitive Species	Habitat conditions
Northern Goshawk	Stands with canopy closure greater than 70% could be treated. This would reduce areas suitable for nesting. In addition, stands in the 41-70% canopy cover class would be treated. About 26% of the WAA would be in 41-100% canopy cover, but an additional 33% of the area would be treated with mitigation that should maintain use in existing territories. The Forest has direction to apply nest and feeding area buffers around known nest territories. This should maintain suitability for pairs returning to the same nest territories. Overall, about 59% of the WAA could provide habitat. This alternative ranks third (along with Alternative B) for maintaining goshawk habitat.
Flammulated Owl Lewis' Woodpecker	Most mitigation is still in place, but in this alternative, thermal cover (stands > 70% canopy cover) could be treated. Since these species use more open stands, treatment of some of the thermal cover could improve habitat. However, this may be offset by the creation of persistent openings, which would result in a decrease in habitat. About 51% of the WAA would be in forested stands with 11-70% canopy cover. This alternative ranks above Alternative D and No Action for maintaining habitat for flammulated owls. This alternative would be beneficial to this species and numbers would be expected to increase in the WAA.
Three-Toed Woodpecker Golden-Crowned Kinglet	These species use denser stands; generally in the 41-100% canopy cover classes. About 26% of the WAA would be in this category. In addition, wood-boring and bark beetles would be expected to increase in burned areas and would provide prey for the three-toed woodpecker. However, this increase in foraging habitat would be transitory (around three years after burning or until the bark starts to fall off). This alternative ranks lowest for maintaining habitat for these species. As this alternative would move the area towards conditions that are closer to what stands would be like under natural conditions, trees would be more vigorous and less susceptible to insects and disease. Foraging habitat would decrease over current conditions, but snag habitat would be maintained.
Pygmy Nuthatch	The HABCAP model does not predict a change in habitat capability under any of the alternatives with treatments. Thinned stands would still provide habitat. Older, larger-diameter trees would be retained, as well as all existing trees with cavities, snags and lightening-struck trees. However, this alternative includes maintenance of persistent openings; these areas would result in a loss of habitat over the long-term. Species using low-elevation mixed conifer stands generally begin nesting in April (based on information from *Birds of North America*). Eggs and nestlings would be vulnerable to loss through mechanical treatments from early April through July. Treatments would be spread out over 10 years; not all treatment would occur during the breeding season, and effects would be short-term. Since this species uses mature ponderosa pine stands, a wildfire (if stand-replacing) would reduce suitable nesting and foraging habitat. This alternative could result in a loss of 2,625 acres of mature stands, and this alternative ranks first (along with the Proposed Action and Alternatives A and C) for maintaining habitat for this species.
Fox Sparrow	This alternative has a low percent chance of wildfire (7% of WAA), but does not include a riparian buffer that would maintain shrub riparian habitats during

Sensitive Species	Habitat conditions
	treatments. Since treatments are proposed over 33% of the WAA, this alternative ranks lowest for maintaining habitat for this species.
Tiger Salamander Northern Leopard Frog	This alternative would rehabilitate 48 miles of existing roads and trails and reduce risk from roadkill mortality. This alternative would not include a 100' riparian buffer or patches of thermal cover. Upland habitats would be somewhat warmer and drier than what occur presently but should be similar to what occurred historically. This alternative has the highest sediment production of all alternatives. This alternative is fairly effective at reducing the risk of wildfire, similar to the Proposed Action and Alternatives A and C. Broadcast burning would occur in the spring or fall. Adult salamanders that may be found in the uplands during this time may be affected. However, these fires should be of lower intensity, and would retain the larger downed woody debris on the ground, which provides cover for salamanders.

Cumulative Effects

In general, the cumulative effects area used in this analysis is the Trout and West Creek drainages. Other activities contributing towards cumulative effects on wildlife habitats include development on adjacent private lands, timber harvest, prescribed burning, wildfire, livestock grazing, dispersed recreation, hunting, and off-road vehicle use.

Teller County has seen approximately a 70% population increase from 1990 to 1999, with increases in residences on private lands within the Forest Boundary. These have the potential to eliminate habitat, to decrease suitability because of disturbance, and for loss of some species due to harassment by pets.

There has been very little private logging reported by the Colorado State Forest Service. There has been some selective logging of larger trees on one private piece in the Trail Creek area. This timber harvest did not include any riparian buffers.

On Forest lands, there was a prescribed burn in the Polhemus area, with about 6,400 acres of understory of ponderosa pine and mixed conifer treated. The Hayman Wildfire (June 2002) burned about 26,800 acres in the Trout and West Creek watersheds.

One timber harvest occurring on federal lands in the WAA is the Trout Creek timber sale, which mechanically thinned about 950 acres and was going to broadcast burn around 1,200 acres to reduce understory fuels. Part of this area burned in the Hayman wildfire. There is also personal use firewood harvest across the WAA that results in removal of standing and downed dead trees.

Salvage within the Hayman Fire area is also being proposed and a portion of the area is within Diversity Units that comprise the WAA. The Wildlife Analysis considered the effects of the salvage and concluded that salvage of dead trees would not change the analysis findings. The effects of the fire are already modeled into the wildlife analysis and the fire-killed stands already considered lacking in live tree canopy. Sufficient numbers of dead trees would be retained within these stands to provide for wildlife needs.

Livestock grazing occurs over about 1/2 of the proposed treatment units, with most of it occurring in the Phantom Unit. This unit also has the largest amount of perennial streams and riparian habitats.

Increases in population in Teller and adjacent counties has resulted in an increase in recreational use in both developed areas and dispersed use across the area. This use has the potential to result in a loss of habitat (trampling at dispersed sites, development of off-road trails, etc.) and disturbance and displacement as a result of human and motorized use. Table 22 summarizes the cumulative effects on Sensitive species.

Table 22. Cumulative Effects

Sensitive Species	Habitat conditions
Northern Goshawk	Timber removal and wildfire have the greatest potential to impact this species. All federal timber harvest includes mitigation to maintain habitat and current nest territories and harvest on private lands has been limited. Areas within wildfires that burn at stand-replacement levels eliminate nesting habitat for the long-term. About 25% of the Trout and West Creek watersheds burned in the Hayman wildfire, and about half of that burned as stand-replacing wildfire. This species uses stands with high canopy covers, and these would be stands that would be at highest risk from wildfire. This species is sensitive to disturbance during part of the nesting season. This is mitigated thru timing restrictions around known nests, but other activities such as recreation have the potential to cause disturbance. If disturbance is repeated during the critical period, there could be nest abandonment.
Flammulated Owl Lewis' Woodpecker	Timber removal and wildfire have the greatest potential to impact this species. All federal timber harvest includes mitigation to maintain habitat and current nest territories and harvest on private lands has been limited. Areas within wildfires that burn at stand-replacement levels eliminate nesting habitat for the long-term. About 25% of the Trout and West Creek watersheds burned in the Hayman wildfire, and about half of that burned as stand-replacing wildfire. Flammulated owls are dependent on cavities for nesting and this habitat component could be affected by firewood gathering. Firewood harvest is regulated by permit, and is only allowed in designated areas.
Three-Toed Woodpecker Golden-Crowned Kinglet	Timber removal and wildfire have the greatest potential to impact this species. All federal timber harvest includes mitigation to maintain habitat and harvest on private lands has been limited. Areas within wildfires that burn at stand-replacement levels eliminate nesting habitat for the long-term. About 25% of the Trout and West Creek watersheds burned in the Hayman wildfire, and about half of that burned as stand-replacing wildfire. These species use stands with high canopy covers, and these would be stands that would be at highest risk from wildfire. Temporary increases in insects following wildfire and insects moving into stands that are stressed provide concentrated foraging areas for three-toed woodpeckers. Salvage of trees burned in Hayman wildfire could reduce foraging habitat available to three-toed woodpeckers. However, based on the initial scoping for Hayman salvage, at most about 36% of Hayman could be salvaged. This would leave large areas of suitable foraging habitat that would be available

Sensitive Species	Habitat conditions
	until the bark starts falling off and insect activity decreases.
Pygmy Nuthatch	Timber removal and wildfire have the greatest potential to impact this species. All federal timber harvest includes mitigation to maintain habitat and current nest territories and harvest on private lands has been limited. Areas within wildfires that burn at stand-replacement levels eliminate nesting habitat for the long-term. About 25% of the Trout and West Creek watersheds burned in the Hayman wildfire, and about half of that burned as stand-replacing wildfire.
Fox Sparrow	Riparian shrub habitats may be affected by livestock grazing, wildfire, recreation, and developments on private land. Currently, livestock graze about ½ of the WAA and these allotments are under increasing management to improve riparian habitats. Wildfire may affect riparian shrub habitats, depending on adjacent fuels, weather, and fire behavior. About 25% of the Trout and West Creek watersheds burned in the Hayman wildfire, and about half of that burned as stand-replacing wildfire. Some of the riparian reaches within these areas were burned over, but re-sprouting will occur within the first couple of years. However, nesting habitat will be lost for the next decade (planning period). Livestock grazing is under increased management. In addition, shrubby vegetation is less susceptible to impacts from trampling. Impacts from grazing should decrease over the long-term. Dispersed camping often occurs adjacent to riparian habitats. Grasses and forbs may be lost or decrease due to trampling, but shrubs should continue to provide nesting and foraging habitat.
Tiger Salamander Northern Leopard Frog	Livestock grazing occurs over about ½ of the WAA and is under increased management. These species breed early in the spring and attach eggs to shoreline vegetation; eggs may be lost to trampling or grazing of shoreline vegetation early in the grazing season. Large, stand-replacing fires could cause habitat fragmentation for these species. Loss of overstory trees (whether left standing or salvaged) will increase surface temperatures, making it warmer and drier. These conditions make the surface unsuitable for use by these species, which need cooler, moister conditions. It is likely that these species adapted to mixed-severity fire. However, wildfires such as Hayman burned larger areas at stand-replacing levels, leaving larger blocks of unsuitable habitat. Over the long-term, as understory grasses, shrubs and trees become re-established and litter increases, surface conditions will become moister and cooler and become more suitable for use by these species.

Summary of the Effects of the Alternatives on Sensitive Species

Table 23 summarizes the effects of the alternatives on Sensitive species. A ranking of 1 is best for the species.

Table 23. Ranking of Alternatives for Effects on Sensitive Species, with Wildfire

Alternative	NA	PA	A	B	C	D	E
Flammulated Owl Lewis woodpecker	4	1	1	2	1	4	3
Northern Goshawk	1	2	2	3	2	4	4
Three-Toed Woodpecker Golden-Crowned Kinglet	1	3	3	2	3	2	4
Pygmy Nuthatch	4	1	1	2	1	3	1
Fox Sparrow	3	1	1	2	1	3	4
Tiger Salamander Northern Leopard Frog	3	2	1	1	2	3	3

Based on those species that are built into the HABCAP model, the action alternatives maintain for habitat for all species except three-toed woodpecker. When factoring in the effects of probability of wildfire (not in the HABCAP model), the action alternatives benefit pygmy nuthatches, Lewis' woodpecker, flammulated owl, fox sparrow, tiger salamander, and northern leopard frog. The three-toed woodpecker and the golden-crowned kinglet would see a decrease in habitat.

The area provides primarily winter habitat for the golden-crowned kinglet. Because all of the action alternatives (except Alternative E) retain patches of thermal cover and stands on steeper slopes, patches of suitable habitat would be left across the WAA. Alternative E, which does not leave the thermal cover patches, would result in a loss of patches that function as winter habitat. Because this species has a winter distribution across the United States, the decrease in winter habitat in the project area should not be detrimental to populations.

Three-toed woodpeckers would also see a decrease in suitable habitat yearlong under any of the action alternatives. However, this species primarily uses higher-elevation spruce-fir forests and the decrease in suitable habitat, even under Alternative E, should not be detrimental to populations.

Table 24. Determinations, by Action Alternative, for Sensitive Species

Alternative	PA	A	B	C	D	E
Flammulated Owl Lewis Woodpecker	MIIH	MIIH	MIIH	MIIH	MIIH	MIIH
Northern Goshawk	MIIH	MIIH	MIIH	MIIH	MIIH	MIIH
Three-Toed Woodpecker Golden-Crowned Kinglet	MIIH	MIIH	MIIH	MIIH	MIIH	MIIH
Pygmy Nuthatch	MIIH	MIIH	MIIH	MIIH	MIIH	MIIH
Fox Sparrow	MIIH	MIIH	MIIH	MIIH	MIIH	MIIH
Tiger Salamander Northern Leopard Frog	MIIH	MIIH	MIIH	MIIH	MIIH	MIIH

MIIH = May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or cause a loss of viability to the population or species

The determinations for all other species (see Section XI for rationale) are "no impact."

The No Action alternative would be detrimental to flammulated owls, Lewis' woodpecker and pygmy nuthatches. These species use mature to old ponderosa pine stands. Flammulated owls, pygmy nuthatches and Lewis' woodpeckers are at risk because they use open stands; across their distribution, ponderosa pine is becoming more dense, decreasing its suitability and increasing the risk of losing habitat to stand-replacing fire.

VIII. RECOMMENDED MEASURES TO AVOID, MINIMIZE, OR MITIGATE ADVERSE EFFECTS

Mitigation Measures or Project Modification

There are several modifications for mitigation that have been incorporated into the alternatives for threatened and endangered species. Stand 14 of the Ridgewood Unit has been modified to avoid any areas of potential Prebles' meadow jumping mouse habitat. Monitoring and future mitigation (if monitoring shows that it is needed) has been incorporated for bald eagles around Manitou Lake. Since known winter roosts around Cheesman Lake burned in the Hayman wildfire, it is not known where these bald eagles will winter. Once Manitou Lake is re-filled, surveys during winter months will determine if there is any concentrated roosting in the area in winter.

All alternatives incorporate several mitigation measures that will maintain habitat or habitat components for several sensitive species. These include silvicultural prescriptions, retention of riparian buffer (except Alternative E), snag and downed woody debris guidelines, management around goshawk and flammulated owl nests, and retention of thermal cover (except Alternative E). See Chapter 2 of the EIS for more information on mitigation measures. Some of these mitigation measures will fully address the needs of some sensitive species.

IX. RESPONSIBILITY FOR A REVISED BIOLOGICAL EVALUATION

This Biological Evaluation was prepared based on presently available information. The Draft EIS and alternatives and the Draft BE have been modified to incorporate the effects of Hayman wildfire. If the Final action is modified in a manner that causes effects not considered here, or if other new information becomes available that reveals that the action may impact endangered, threatened, proposed, or sensitive species in a manner or to an extent that was not previously considered, a new or revised Biological Evaluation will be required.

X. CONTACTS

There were several contacts and sources used for this analysis. Phone conversations and a field trip were made with the USFWS (listed in the Consultation History section). In addition, USFS District Biologists Steve Tapia and Denny Bohon provided information. Brian Linkhart, of the University of Colorado, provided his thesis on flammulated owls (see Literature Cited section of EIS).

XI. SPECIES THAT ARE NOT EXPECTED TO OCCUR WITHIN THE PROJECT AREA – RATIONALE FOR NO FURTHER ANALYSIS

The TES below are listed for the Pike and San Isabel National Forests, but are not expected to be present in the project area based on known distribution, availability of suitable habitat, etc. Species discussions and rationale for not considering them is found here.

Wolverine *(Gulo gulo luscus)*. The population status and distribution of wolverine in Colorado is uncertain at this time. There were several records from the 19th century, but populations were apparently never high. The Colorado Division of Wildlife has conducted surveys for wolverines without finding any definitive population in the state (Fitzgerald et al. 1994). Bianci (1994) reviewed distribution range-wide; information from Colorado suggests that wolverines were not common historically and that current numbers are not self-sustaining.

The wolverine may occur in the following Colorado counties: Chaffee, Clear Creek, Custer, Huerfano, Jefferson, Lake, and Park (USFS 2000), none of which are in the project area. The wolverine is a scavenging predator and depends on a diverse ungulate population with a high turnover rate. It is a solitary animal and can cover great distances in short time periods. Even under optimal habitat conditions, wolverines have low natural densities. They have extremely large home ranges, covering up to 160 square miles in their constant search for carrion. Wolverines are found in mature and intermediate timbered areas around natural openings, including cliffs, slides, basins, and meadows. Their habitat use varies seasonally; in summer they favor cooler subalpine and alpine areas.

Colorado Natural Heritage Program (CNHP) information on actual occurrences indicates that the wolverine has not been documented in the project area. It is unlikely that wolverines occur in the project area since no positive records have been recorded in the state since the early 1900s. Wolverines are listed by NDIS as known to occur in Douglas and El Paso counties, but extirpated. This species will not be analyzed further.

Wet Mountains Yellow-Bellied Marmot *(Marmot flaviventris notioros).* The Wet Mountains yellow-bellied marmot is found in rocky areas with boulders and talus slopes where it feeds primarily on grasses and forbs (U.S. Forest Service 2000). This marmot is endemic to an area in Huerfano County and is not anticipated to occur in the project area.

NDIS does not list this species as present in any of the three counties in the project area. This species will not be analyzed further.

American Marten *(Martes americana)*. The American marten is mostly a boreal mammal, ranging across Alaska and Canada to Newfoundland and southward at increasingly high elevations along mountain ranges to California and New Mexico. The marten is an inhabitant of subalpine spruce-fir and lodgepole pine forests, alpine tundra and occasionally montane forests (Fitzgerald et al. 1994).

In Colorado, martens occur at elevations of 8,000 to 13,000 feet. They are associated with spruce-fir and lodgepole vegetation types with mature to old growth structural stages. Marten are arboreal and can use trees for denning and feeding. They prefer moderate to high canopy cover, especially in winter. Snags and down dead material are important components of denning and foraging habitat (USFS 2000).

No populations of this mammal are known to occur within the project area. NDIS does not show this species as present in any of the three counties in the project area. Fitzgerald et al. (1994) also do not include the project area as within the distribution of this species. Buskirk and Ruggerio (1994) summarized many habitat studies range-wide and found that martens are rare or absent in stands dominated by ponderosa pine or pinyon pine. Because there is no evidence of use in the WAA, and martens are not expected to be present, this species will not be analyzed further.

Colorado Hog-Nosed Skunk *(Conepatus mesoleucus figginsi).* This species uses rocky canyon country in pinyon-juniper woodlands and montane shrublands and has also been reported from desert and grassland environments. In Colorado, the few records are associated with oakbrush and pinyon-juniper woodlands in southeastern Colorado. They are thought to be mostly nocturnal and use rocky ledges, caves, abandoned mines, abandoned burrows, woodrat nests, and similar sites for denning. Two subspecies have been named from Colorado: *C.m. figginis* was named from specimens from Baca County, while *C.m. fremonti* is reported from El Paso and Fremont counties (Fitzgerald et al. 1994). Based on the available information, *C.m. figginsi* is not expected to be present in the project area and will not be discussed further.

Spotted Bat *(Euderma maculatum).* This bat is known to occur on the western slope in Moffat and Montezuma counties near Mesa Verde, where a specimen was recently found in a Mexican spotted owl pellet. Although no known records exist for the Pike and San Isabel, there is some limited potential for the spotted bat to occur. This species does not use caves but roosts in rock crevices and cliffs. It has been found in coniferous forests and pinyon-juniper (USFS 2000).

NDIS does not list this species as being present in any of the three counties in the project area. Fitzgerald et al. (1994) only show the extreme southwestern corner of the state as occupied. Harvey et al. (1999) and Watkins (1977) show only the extreme southwestern part of Colorado as within their distribution. Effects on this species will not be analyzed further.

Black-Tailed Prairie Dog *(Cynomys ludovicianus).* This species occurs in eastern Colorado and is associated with plains grassland habitat. This species inhabits open prairies and plains, in areas with flat to gently rolling hills. The decline of this species is related to the loss of prairie habitat, prairie dog control, and Sylvatic plague (USFS 2000). Because the WAA does not include any areas of open plains and prairies, this species will not be discussed further.

Ringtail *(Bassariscus astutus).* The ringtail inhabits arid and semiarid habitats throughout the southwest, including most of southern and western Colorado. The ringtail is probably most common in the canyon country of the southwestern part of the state. In Colorado, its preferred habitat includes areas in rimrock canyons with cliffs that have perennial streams and abundant trees and shrubs, and foothills of pinyon pine-juniper woodlands, montane shrublands, or mixed conifer oakbrush (Fitzgerald et al. 1994).

For daytime retreats and nurseries, ringtails use openings in rock crevices, boulder piles, and rock slides, or trees hollows, ground dens under brush piles, or tree-root-based burrows. They sometimes use human-made structures. The ranges of males may overlap those of females and courtship occurs in early spring (April) in Colorado. This species eats both animal and plant materials and is mostly nocturnal and shy. This species may also become established around human habitations, both rural and urban (Wilson and Ruff 1999).

NDIS lists the ringtail as known to occur in all three counties: fairly common in Teller, uncommon in Douglas, and rare in El Paso. The most suitable habitat in the project area is found in the Missouri Gulch drainage, but the rock outcrops are outside of the project area boundary. There may be other small areas of potential habitat in the Trail Creek area and the rock slides on Signal Butte. The area is expected to have low potential to provide suitable habitat for this species (S. Tapia, Wildlife Biologist, pers. comm.). Because the area has such low potential to provide suitable habitat, effects for this species will not be analyzed further.

Dwarf Shrew *(Sorex nanus).* The dwarf shrew occurs in most of the mountains in Colorado. It is associated with alpine and subalpine coniferous forests, meadows, shrubs, rockslides, and talus slopes (USFS 2000). Dwarf shrews appear to be relatively tolerant of arid situations and rocky environments appear to be preferred habitat. Populations appear to be contiguous in the central Rocky Mountains (Montana and Wyoming) but fragmented and restricted to high elevation mountain ranges in the southern Rocky Mountains (Arizona and New Mexico) (Wilson and Ruff 1999).

NDIS lists the dwarf shrew as known to occur but rare in Teller and El Paso counties. Fitzgerald et al. (1994) show the project area as being within the distribution of this species. Suitable habitat may be found in areas such as the rockslides on Signal Butte.

This shrew once ranged from Kansas to New Mexico, but their range shrank with the recession of the glaciers. Due to its relatively isolated habitat and its small size, very little is known about this shrew, including its historical distribution and current population trends. None of the alternatives would impact alpine or subalpine habitats or affect suitability of rocky areas to provide habitat and affects on this species will not be analyzed further.

Fringed-Tailed Myotis *(Myotis thysanodes pahasapensis) subsp.* In Colorado, this subspecies of fringed-tailed bat may occur in Baca, El Paso (Cave of the Winds), Huerfano, Las Animas, Otero, and Pueblo counties (USFS 2000), although NDIS does not list it for the three counties in the project area. Fitzgerald et al. (1994) does show the project area as within the distribution of the species, but not the subspecies. It inhabits mid-elevation grasslands, deserts, and oak and pinyon woodlands. In Colorado, this bat is reported to breed in caves and winter in pinyon-juniper and ponderosa pine habitats. It typically forages over water courses (USFS 2000). Fitzgerald et al. found that this species is not common in Colorado, but is found in ponderosa pine woodlands, greasewood, oakbrush, and saltbush shrublands. Caves, mines, and buildings are used as both day and night roosts.

Cave of the Winds is about 15 miles from the project area. Farrell and Studier (1980) reviewed the ecology of this species and found that it has been speculated that fall migrations of this species were of short distances to lower elevations or more southern areas where the bats could be periodically active in the winter. Studies in New Mexico found this species roosting in ponderosa pine snags and live ponderosa pine trees with long, vertical cracks (Chung-MacCoubrey 1996). These roosts were found in isolated ponderosa pine stands in the drainage bottoms of pinyon-juniper woodlands or at the interface of the ponderosa pine and pinyon-juniper habitats.

There are no caves in the project area. In 1994 there were surveys conducted to locate abandoned mines on the Pikes Peak Ranger District (S.Tapia, District Biologist, pers.comm.). Three shafts were found north of Missouri Gulch (outside of the project area) and they were backfilled. One adit was located on Rule Creek. Bat surveys found that fringed-tailed myotis were using the adit and it was closed with a bat grate, allowing access to bats. The Colorado Natural Heritage Program database has recorded this location as found in 1997 and is between the Long John and Ryan Quinlan treatment units, but not in either. The project area may provide foraging and roosting habitat for this species.

Historical records of the distribution and occurrence of the fringe-tailed myotis are very rare. It was believed that the populations of this bat were declining in Colorado. However, recent research suggests that this may not be true because the bat population is very widespread and historical records gave the impression of decreasing populations (Armstrong et al. 1995, in Foster and Wheeler 1999).

None of the alternatives have any affect on cave or mine roost habitat or riparian foraging habitat. They appear to winter in ponderosa pine habitats, but none of the alternatives would affect suitability for winter habitat (snags and live trees with long, vertical cracks). This is because of mitigation to retain all existing snags, trees with cavities, lightening-struck trees and larger overstory trees. Effects on this species will not be analyzed further.

Townsend's Big-Eared Bat *(Plecotus townsendii)*. These bats are cave-dwelling bats and have been found in a wide variety of habitats, from arid juniper/forests to high elevation mixed-conifer forests. In winter, large aggregations of bats roost communally in caves or abandoned mine tunnels. They have also been known to use abandoned buildings. During the breeding season, females roost with their young in nursery colonies. Occasionally, tree cavities are used as roosts by individuals.

Distribution of this species is strongly correlated with the availability of caves and cave-like roosting habitat (Idaho State Cons. Effort 1995). These structures are used in the summer for maternity colonies and in the winter for hibernacula. Harvey et al. (1999) show that the majority of Colorado is within the expected distribution of this species, although no large colonies have been found in Colorado (Idaho 1995). A more recent review of distribution in Colorado (Conference call, 16 May 2000) determined that there are seven known maternity roosts, all east of the Continental Divide. Three of these are in caves, and four are in abandoned mines; one is under county ownership and the rest are in private ownership. There have been 153 winter hibernacula and/or transition roosts documented; 142 are in abandoned mines and eleven are in caves. Of the mine roosts, 134 are on federal land and eight are on private land. Of the cave roosts, five are on FS, three are on BLM, one on state, and two on private land.

The Colorado Natural Heritage Program database lists locations near Queens Canyon, about 10 miles southwest of the Rampart Treatment Unit; an area over 20 miles to the southeast of Rampart; and Cave of the Winds, about 12 miles southeast of Skelton.

There are no caves in the project area. In 1994 there were surveys conducted to locate abandoned mines on the Pikes Peak Ranger District. Three shafts were found north of Missouri Gulch (outside of the project area) and they were backfilled. One adit was located on Rule Creek. Bat surveys found that fringed-tailed myotis were using the adit and it was closed with a bat grate, allowing access to bats. No Townsend's big-eared bats were documented. Much of the WAA could provide foraging habitat.

Population trends are unknown for this species, but it is suspected that they are decreasing. This is due to the fact that this species is very susceptible to human disturbance. There are several documented cases where this species has disappeared as a result of spelunking and other human disturbance in caves and mines (Armstrong et al. 1995; and others).

This species is strongly associated with caves and cave-like features (abandoned mines). None of the alternatives has any effect on these types of features. Foraging habitat, with moths as primary prey, would not be changed under any of the alternatives. This species will not be carried forward into the analysis.

Peregrine Falcon (*Falco peregrinus).* The first records of peregrine falcons in Colorado date back to 1897, when it was reported that these falcons were locally common. Since then, their numbers have dramatically decreased. In 1977 it was reported that only four nesting pairs existed in Colorado. Through reintroduction efforts since then, the numbers have increased considerably (Foster and Wheeler 1999).

The species range is cosmopolitan; in Colorado the majority migrate and winter south of the State. This species is highly specialized, as it relies completely on cliff habitat for nest sites and the number of suitable nest sites is finite and essentially non-renewable. Peregrines nest from 5,400 to 12,000 feet in Colorado, selecting cliff ledges 200 feet or higher with a wide view and plentiful prey (other birds). Peregrines may forage several kilometers from the nest site. They initiate pursuit of prey either from a perch or while soaring.

In 1998 Colorado Division of Wildlife personnel found peregrines occupying 90 of 107 known nesting sites and located six new sites. Approximately ¼ of the Colorado nesting sites are in the Southern Rocky Mountain Province, which includes the PSI National Forest. The majority of known nests in Colorado are on public lands (USFS, BLM, and NPS).

A peregrine falcon survey of the Pike National Forest in 1991 checked 24 of 31 cliffs. No peregrines were recorded in the project area, but there were birds found on eight other sites. Sheep Nose and Turkey Rock were not surveyed but were listed as potential sites. Both of these sites are popular rock-climbing areas. The Sheep Nose cliff is about ¼ mile northwest of the Trail Creek unit and Turkey Rock is about 1 mile west of the Trail Creek area.

Because the Trail Creek unit was dropped after it burned in the Hayman wildfire, effects on this species will not be considered further. While peregrines may forage for several miles from cliff nest sites, preferred foraging habitats are croplands, meadows, river bottoms, marshes, and lakes (USFWS 1977), none of which would be affected by any of the alternatives.

Common Loon *(Gavia immer).* On the Forests, the common loon occurs mostly as a fall migrant at mountain lakes and reservoirs and on the eastern plains. The loon prefers clear water or shallow depths for foraging (USFS 2000). NDIS do not list this species as present in any of the three counties in the project area. This species will not be considered further.

Harlequin Duck *(Histrionicus histrionicus).* The harlequin duck was once a summer resident and possibly occurred in Park and El Paso counties. Small breeding populations historically occurred in the mountains, but apparently became extinct in the 1880s. This species breeds along swift, turbulent mountain streams with a high macro-invertebrate food source and dense riparian vegetation. Presently, they breed on inland mountain streams (Washington, Oregon, Montana, Wyoming, and Idaho) and winter along the Pacific coast, but may still occur as a migrant in the vicinity (USFS 2000).

NDIS does not list this species as present in any of the three counties in the project area. The *Colorado Breeding Bird Atlas* has no records for this species. This species won't be analyzed further.

American Bittern *(Botaurus lentiginosus).* The American bittern is a summer resident on the eastern plains of Colorado and in mountain parks. It inhabits cattail marshes or wetlands with tall emergent vegetation and occasionally ventures into adjacent wet meadows. The *Breeding Bird Atlas* does not report possible, probable, or confirmed breeding for this species in the project area. NDIS reports this species as known to occur but rare in El Paso and Douglas counties.

None of the project activities would affect the suitability of these habitats. This species will not be analyzed further.

White-Faced Ibis *(Plegadis chihi).* This bird is a spring migrant in eastern Colorado, in the lowlands and mountain parks. It breeds primarily in the San Luis valley. Characteristically, it inhabits wetlands, especially stagnant marsh, swamp, bogs, or ponds with lush vegetation, but occasionally it is found on reservoir shorelines and irrigated fields (USFS 2000). This species is gregarious, nesting colonially, often with other ibis, herons, and cranes. None of the project activities would affect the suitability of these habitats. This species will not be analyzed further.

Greater Sandhill Crane *(Grus canadensis tabida).* This bird is a rare breeder in Colorado and generally occurs as a migrant along the eastern plains and mountain valleys, especially the San Luis valley and parks. The greater sandhill crane prefers wetlands with nearby meadows or cultivated land. Breeding has been confirmed in the northwestern part of the state (Kingery 1998). It nests on emergent vegetation with surrounding tall grasses, rushes and sedges. None of the project activities would affect the suitability of these habitats. This species will not be analyzed further.

Long-Billed Curlew *(Numenius americanus).* The long-billed curlew occurs as a summer resident on the southeastern plains of the Forests. It historically occurred in mountain parks and valleys, including South Park, where it still may occur as a migrant. The *Colorado Breeding Bird Atlas* shows most breeding in the southeastern part of the state, with none in the project area. This species is now found primarily in plain grasslands and sometimes in wheat fields or fallow fields and nests close to standing water. None of the project activities would affect the suitability of these habitats. This species will not be analyzed further.

Black Tern *(Chlidonias niger).* A spring migrant on he eastern plains and mountain parks in Colorado, the black tern is associated with aquatic habitats that have emergent vegetation, such as cattail marshes with adjacent large open water. They are found in all Colorado counties except Teller (USFS 2000). None of the project activities would affect the suitability of these habitats. This species will not be analyzed further.

Black Swift *(Cypseloides niger).* The black swift has localized distribution in the mountains with records in El Paso County (USFS 2000). NDIS lists this species as present in El Paso and Teller counties. It nests on cliffs near or behind high waterfalls, usually on a well-shaded site and bathed in mist. There are no waterfalls in the project area and this species won't be considered further.

Boreal Owl *(Aegolius funereus).* Boreal owls are associated with high elevation, subalpine mature, and old growth spruce/fir forests. Forest types used include lodgepole pine, fir, and spruce, and occasionally mixed conifer forests. They require mature/old growth vegetation, especially during the breeding season. They nest in tree cavities excavated by woodpeckers, requiring snags with 15" dbh or larger. Nesting habitat includes a mix of spruce-fir and open meadows that provide prey species, especially voles. Nests are typically found in association with water. Boreal owls may use younger-age tree stands for foraging during the non-breeding season. Home ranges cover as much as 2,200 acres, but can overlap extensively. Only a small area around the nest is defended during the breeding season.

The *Colorado Breeding Bird Atlas* reports that this species has been found in most mountain ranges, but the distribution map shows confirmed breeding well to the west of the project area. The NDIS does not list this species as present in any of the three counties in the project area. Because of the location, elevations and habitat types in the project area, this species is not expected to be present. This species will not be analyzed further.

Purple Martin *(Progne subis).* This species is a summer resident of the mountains of western Colorado, but occasionally is found on the east slope and plains. In Colorado it is known to breed in loose colonies in old growth aspen forests but also inhabits deciduous riparian woodlands, aspen stands, open coniferous forest burns with snags, woodland edges, and urban areas. Nesting occurs in tree cavities or eaves of buildings (USFS 2000).

The *Colorado Breeding Bird Atlas* shows possible, probable, or confirmed breeding as only occurring in the western part of the state. NDIS information does not show this species as being present in any of the three counties in the project area. This species won't be analyzed further.

Loggerhead Shrike ***(Lanius ludovicianus).*** The loggerhead shrike occurs primarily in western valleys and eastern Colorado but ranges to montane meadows, riparian areas, and pinyon-juniper woodlands. Its habitat includes open country with scattered perching sites (USFS 2000).

While this species is known to occur in all three counties (NDIS), there is no breeding in the project area. This species is not associated with ponderosa pine habitats and won't be discussed further.

Osprey ***(Pandion haliaetus).*** Generally associated with lakes, rivers and reservoirs, the ospreys primary food source is fish. The osprey is also an uncommon summer resident in the mountains. Most of these birds winter from Texas to Central America. It uses large broken topped trees or snags for nest building. Although local Colorado populations now seem well established, numbers remain low. NDIS shows this species as known to occur in El Paso and Douglas counties. Barrett (Kingery 1998) does not show any possible, probable, or confirmed evidence of breeding in the project area. While not a breeder in the project area, this species may be found using large water bodies during movements. Because of the lack of large water bodies and the fact that any use would be during summer by non-breeders or during migration, effects for this species won't be analyzed further. None of the alternatives would have any affect on use of large water bodies for foraging during migration. This species will not be carried forward for analysis.

Merlin ***(Falco columbarius).*** The merlin is a migrant and winter resident on the Forests at low elevations and is generally found in grasslands, prairie, and agricultural areas, but is seen in most habitats. It is found in every County on the Forests (USFS 2000). This species forages over park-like grasslands, bogs, and shrubby barrens. Primary diet is composed of small mammals, birds, and large insects. The project area may provide transitory and/or winter habitat.

There are only two confirmed breeding records of the merlin in Colorado and they are from 1877 and 1887. Fourteen were seen in 1990 in Jefferson County. The number of confirmed records suggests that the merlin has never been a common breeder or resident of Colorado (Foster and Wheeler 1999). None of the alternatives would have any affect on use of low elevation foraging areas during winter. This species will not be carried forward for further analysis.

Olive-Sided Flycatcher ***(Contopus borealis).*** There is not much historical information on this species prior to the 1960s. In the mid-1960s the flycatcher numbers decreased dramatically, maybe due to clearcuts and lack of available snags. The long-term historical trend is difficult to analyze due to the lack of adequate historical data on populations and factors that adversely affect the species (Foster and Wheeler 1999).

This species of flycatcher is primarily a mountain summer resident at elevations between 10,000 and 11,500 feet in mature spruce-fir and Douglas-fir forests. It is a migrant at lower elevations. The olive-sided flycatcher is associated with montane coniferous forests and its territories often contain large conifers and bogs and meadows (USFS 2000). Standing dead trees are an important habitat component for this species. They prey almost exclusively on flying insects. Because the project area ranges from 7,600 to 9,500 feet and the area is dominated largely by ponderosa pine with some Douglas-fir and there are no bogs or wet meadows, effects on this species will not be analyzed further.

Boreal Toad *(Bufo boreas boreas).* This species is not federally listed, but is listed as endangered for the state of Colorado. Historically they were found in the Front Range and many other ranges of Colorado but now are most abundant in the Collegiate Peaks Range, Arapahoe National Forest, and Rocky Mountain National Park. Current known distribution represents a decline of over 80% in distribution (Nesler and Goettl 1994). The boreal toad occurs throughout most of the mountainous portions of Colorado but appears to be absent from the Wet Mountains and Pikes Peak region. They are most common between 8,500 and 11,000 feet in elevation. This toad inhabits marshes, wet meadows, and the margins of streams, beaver ponds, lakes, and glacial kettle ponds in subalpine areas of Colorado. It is also found in shallow water or among sedges and shrubby willows where soil is damp or wet (USFS 2000).

Within the last 25 years, populations of western toads have undergone population crashes in Colorado and other states (Maxell 2000). They are now listed as endangered by the State of Colorado and considered a candidate species, which is warranted, but precluded, for federal listing in the southern Rocky Mountains (Colorado, southeast Wyoming, and northern New Mexico). This toad was found historically in the Front Range as well as several other mountain ranges. Follow-up surveys of historic sites in Colorado found that boreal toads were absent from 83% of the locations (Nessler and Goettl 1994). There are no known populations in the project area vicinity now (1994).

There are many factors that have been brought forward as contributing to this decline, but the most plausible is stress-induced elimination of populations by red-leg disease, a highly contagious bacterial infection (Nessler and Goettl 1994).

While NDIS does not list this species as present in any of the three counties, another distribution map does suggest that this species could be present in this part of Colorado. Effects on this species won't be analyzed further.

Regal Fritillary Butterfly (*Speyeria idalia*). This butterfly is associated with mesic prairie environments. The adults of this species emerge mid-June to mid-September in wet meadows and marshlands, where they lay their eggs on dead vegetation. The larvae overwinter as hatchlings and are nocturnal feeders of *Viola* plant species in the spring. The regal fritillary butterfly may occur in the following counties: Douglas, El Paso, and Jefferson (USFS 2000). Wet meadow and marshland habitats would be maintained in their current condition under all alternatives and effects won't be analyzed further.

Flathead Chub *(Hybopsis gradiis).* A member of the minnow family, this species is generally found in the mainstream of fast-running, turbid waters with sand or gravel substrates. The Colorado population is restricted to the lower Arkansas and Purgatoire Rivers and Fountain Creek. The lack of Flathead populations in the Upper Arkansas River is most likely due to river alterations, as this species once had a natural population as far upstream as Salida. The Flathead chub is an omnivorous feeder and is tolerant of organic pollution. It occurs in the following counties: El Paso, Fremont, Las Animas, Otero, and Pueblo (USFS 2000). This species is not expected to be present in the analysis area and won't be considered further.

Southern Redbelly Dace *(Phoxinus erythrogaster).* There is only one known population of southern redbelly dace in Colorado. This population is located in a small tributary to the Arkansas River in Pueblo. This species inhabits slow-moving waters in small creeks that have ample riparian vegetation for shade. The substrate consists of silt with algal growth. This species is not expected to be present in the analysis area and won't be considered further.

Plains Topminnow *(Fundulus sciadicus).* Disjunct Colorado populations are found in cool, foothill streams, intermittent plains streams, and the lower South Platte River. The plains topminnow requires a specialized habitat of still, clear water with filamentous algal growth. They spawn in late spring and early summer and use aquatic plants to deposit their eggs. These minnow occur in the following counties: Douglas, Jefferson, and Pueblo.

BIOLOGICAL ASSESSMENT

For Threatened and Endangered Species

TROUT-WEST HAZARDOUS FUELS REDUCTION PROJECT

Pikes Peak Ranger District
Pike National Forest

Prepared by: Betsy Hamann, TEAMS Wildlife Biologist 04/07/03

I. INTRODUCTION

The purpose of this Biological Assessment is to determine the likely effects of the selected alternative for the Trout-West Hazardous Fuels Reduction Project on federally listed species (endangered, threatened, and proposed).

Section 7 of the Endangered Species Act of 1973, as amended, requires federal agencies to use their authority to carry out programs to conserve endangered and threatened species, and to insure that actions authorized, funded or carried out by them are not likely to jeopardize the continued existence of listed or proposed species, or result in the destruction or adverse modification of their critical habitat. A Biological Assessment must be prepared for federal actions that are "major construction activities" (a project significantly affecting the quality of the human environment) to evaluate the potential effects of the proposal on listed or proposed species.

II. DESCRIPTION OF THE PROPOSAL

The PSICC National Forest has analyzed proposed vegetation treatments in the Trout and West Creek watersheds on the Pike National Forest. The purpose and need of this proposal is to reduce fuels in the project area, to moderate the potential adverse effects of wildfire, provide for firefighter and public safety and to reflect historic vegetation conditions that are thought to be more sustainable than the current condition.

These actions would include thinning in the overstory and understory but retaining the largest trees in the overstory. Heavy thinning would include the potential for sawlog removal, thru ground-based logging equipment or helicopters. Light thinning would mostly treat the biomass on-site. Broadcast burning would also occur. Temporary road construction, and restoration of temporary and existing non-system roads is also proposed.

The Proposed Action includes thinning of about 20,170 acres; yarding sawlogs from about 17,000 of these acres; construction of about 14 miles of temporary roads to facilitate sawlog removal; restoration to near natural conditions about 48 miles of existing unclassified roads once they are no longer needed to facilitate sawlog removal; and follow up slash treatments such as piling and burning of slash. Thinning would occur within six project areas. The Trail Unit was dropped from consideration following the Hayman Fire in 2002.

Six action alternatives were fully analyzed. Alternative A would include mechanical treatment as proposed, but would not use prescribed burning to reduce fuels. Alternative B would implement the Proposed Action on a portion of the project area within one mile of private property that contains at least one home per 40 acres. Alternative C would implement the Proposed Action without building any new temporary roads, which would require increased helicopter yarding. Alternative D would treat vegetation within ¼ mile of private property with at least one home per 40 acres. Alternative E would treat the area most aggressively, including approximately 26,320 acres and would include harvest openings on 30% of the project area to mimic historic conditions. See the EIS for a full description and maps for each of the alternatives.

After consideration of the alternatives, the Proposed Action was identified as the Preferred Alternative when the Draft EIS was released. After review of the public comments on the Draft EIS and re-evaluation of the alternatives, the Proposed Action was identified as the Selected Alternative. Stands would be thinned, with large variability in canopy cover, over the project area. Canopy cover may range from a low of 15% to as high as 30%, but would average around 25% canopy cover after treatment.

Project Area

The project area is predominantly in Teller County, with small amounts of Douglas County on the north and El Paso County on the east. This area includes the Trout Creek and West Creek drainages. The area is dominated by ponderosa pine along with Douglas-fir and aspen. The EIS provides more information on the existing vegetation.

The Wildlife Analysis Area used is the area covered by Forest Plan diversity units, 918-925 and 930**.** This includes all of the treatment units, as well as Forest areas between treatment units and areas to the north, which are also in the Trout and West Creek watersheds.

Table 1. Existing Vegetation in Wildlife Analysis Area.

Vegetation type	Area (acres)	Area (%)
Coniferous forest	70,417	91
Aspen	1,452	2
Grassland	4,492	6
Shrubland	1,163	1
Total	77,679	100

The forests within the Analysis Area typically have a closed canopy. Based on Forest RIS data, currently the forested areas are distributed as follows:

Table2. Forest habitat types and percent of the area of the WAA by canopy cover class before Hayman wildfire

Forested cover classes	Acres	Percent
0-10% canopy closure	6,300	8%
11-40% canopy closure	7,340	9%
41-70% canopy closure	48,940	63%
71-100% canopy closure	10,070	13%

Table 3. Forest habitat types and percent of the area of the WAA by canopy cover class after Hayman wildfire

Forested cover classes	Acres	Percent
0-10% canopy closure	17,242	22%
11-40% canopy closure	7,340	9%
41-70% canopy closure	39,637	51%
71-100% canopy closure	8,147	11%

As is shown in the above tables, Hayman wildfire resulted in an increase in open, early seral stands (went from 8% to 22%) and a decrease in the more closed canopy stands. However, the WAA still has 62% of the area in forested stands with canopy cover over 40%.

Historically, the area was more open ponderosa pine forest, with some persistent openings across the landscape. With a reduction in wildfire, stand density has increased. As a result, the risk of wildfire has increased as well. Currently the area is used for dispersed recreation and includes numerous subdivisions with residences.

Forest Plan management direction includes rural and non-roaded natural recreation, riparian management, wildlife management indicator species management, and wood fiber production.

III. SPECIES CONSIDERED AND THEIR STATUS

The US Fish and Wildlife Service provided a list of those threatened or endangered species that could potentially occur in the Project Area (USFWS 3/13/02).

Table 4. T&E Wildlife Species Potentially Occurring in the Project Area

Species	**Scientific Name**	**Status**	**Suitable habitat present?**	**Known or Expected to be present?**	**Species carried forward in analysis**
Mammals					
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	T	Y	Y	Y
Birds					
Bald eagle	*Haliaeetus leucocephalus*	T	Y	N	Y
Mexican spotted owl	*Strix occidentalis lucida*	T, S	Y	N	Y
Invertebrates					
Pawnee Montane Skipper	*Hesperia leonardus montana*	T	Y	Y	Y

Species	Scientific Name	Status	Suitable habitat present?	Known or Expected to be present?	Species carried forward in analysis
Fish					
Greenback Cutthroat trout	*Onchorynchus clarki stomias*	T	N	N	N

T = Threatened, E = Endangered, C = Candidate

IV. CONSULTATION HISTORY

The US Fish and Wildlife Service provided a species list for the project area, and this was used to identify threatened, endangered and candidate species to be considered (USFWS 3/13/02). Additional conversations with the USFWS (L. Ellwood 3/4/02; L. Ellwood 4/9/02; J. Peterson 4/10/02; J. Peterson 4/26/02) provided additional information on species and clarification of the proposal.

A field trip with Jeff Peterson on 4/19/02 reviewed the Missouri Gulch area for potential Mexican spotted owl habitat, meadows adjacent to riparian areas for Preble's western jumping mouse, and the lower end of the Trail Creek unit for Pawnee montane skipper habitat. The results of this field trip are noted in the appropriate section.

Post-Hayman changes were discussed with J. Peterson on 10/17/02. The biggest change as a result of Hayman was the burning of the potential Pawnee Montane Skipper habitat in the Trail Creek Unit (Trail Creek is now dropped from the proposal). Another potential change is that areas of concentrated winter roosting habitat for bald eagles around Cheesman Reservoir were burned in Hayman wildfire. It is not known where these eagles will winter now over the long-term, and monitoring was added to this proposal to address that issue.

The Biological Evaluation prepared for the DEIS was reviewed by J. Peterson and he concurred with the analysis and determinations made (10/25/02).

V. ANALYSIS OF EFFECTS – FEDERALLY LISTED AND PROPOSED SPECIES

The impacts associated with thinning treatments and broadcast burning are the focus of the discussion below. Although the creation of a structurally more diverse forest will positively affect the majority of wildlife species in the Analysis Area, some temporary adverse effects may occur. These include: disturbances during logging and burning, alteration of habitats, etc. These are only temporary adverse effects, but the long-term effects are anticipated to maintain or improve habitat for most species and reduce the risk of extensive, stand-replacing wildfire. The treatment areas encompass only a portion of the available habitat in the analysis area.

VEGETATION EFFECTS

NO ACTION WITH WILDFIRE

There is a high potential for wildfire in the WAA within the next 10 years. If this occurs, expected changes in forested habitats are shown below. It is predicted that there could be 4-10,400 acre stand-replacing fires in the Trout and West Creek watersheds. Because the WAA is about half of the Trout and West Creek watersheds, this means there could be 2 wildfires in the WAA. The table below shows an estimate of what canopy closures could be after a wildfire in the WAA (assuming half of burned acres are stand-replacing, similar to Hayman).

Table 6. Canopy Closures under No Action, with wildfire

Forested cover classes	Acres	*Percent*
0-10% canopy closure	27,742	36%
11-40% canopy closure	5,974	8%
41-70% canopy closure	32,077	41%
71-100% canopy closure	6,599	8%

SELECTED ALTERNATIVE/PROPOSED ACTION

The Proposed Action proposes to treat around 20,170 acres of Ponderosa pine and Douglas-fir stands in six treatment areas. Around 17,000 of the acres would be heavier mechanical treatments, using tractor, helicopter and cable systems. Around 2,000 acres would be lighter treatments. None of the treatments would be in the 71-100% canopy closure class. Expected canopy cover class following treatment is shown below.

Table 8. Canopy Closures After Implementation of Proposed Action

Forested cover classes	Acres	Percent
0-10% canopy closure	17,242	22%
11-40% canopy closure	25,339	33%
41-70% canopy closure	21,637	28%
71-100% canopy closure	8,174	11%

An indirect effect of the proposed treatments is the reduced risk of wildfire. However, there is still a risk of wildfire. If wildfires burned after treatments as described in the EIS, the results would be as shown below.

Table 9. Canopy Closures After Implementation of Proposed Action with wildfire

Forested cover classes	Acres	Percent
0-10% canopy closure	19,867	26%
11-40% canopy closure	24,131	31%
41-70% canopy closure	20,613	26%
71-100% canopy closure	7,386	10%

This alternative proposes some level of treatment over about 26% of the Wildlife Analysis Area.

PREBLE'S MEADOW JUMPING MOUSE *(Zapus husonius preblei)*

Natural History, Distribution and Effects

This species was proposed for listing in 1997 and was listed as threatened in 1998. Critical habitat was designated in July 2002 (Federal Register, Vol. 67, no. 137). There were five areas in the Upper South Platte HUC that were identified as critical habitat; four of which are on the Pike-San Isabel NF. Unit SP14 includes portions of Trout Creek up to an elevation of 7600 feet. Specifically, it includes Trout Creek on the western 1/3 edge of the Ridgewood Project up to 7600'. The Project Area ranges in elevation from 7600 to 9300 feet.

This mouse is found in a variety of habitats but prefers low meadows for feeding (USFS 2000). The USFWS has identified habitat as mature plains riparian vegetation with relatively undisturbed grassland and a water source in close proximity.

Decline of the Preble's meadow jumping mouse is linked to widespread habitat alteration; including conversion of grasslands to farms; livestock grazing; water development and management practices and residential and commercial development (Fed. Reg., Vol 62, No. 571). Areas that are heavily grazed by livestock or are burned, especially during the warm season, reduce structural habitat diversity and reduce availability of food resources necessary for the buildup of fat reserves before winter hibernation.

Surveys were done in the general area (September 2000 and July 2001); there were twelve sites surveyed and five of the sites were located in the Wildlife Analysis Area. Preble's were found at four sites, none of which were in the project area. Most of the Preble's were found on Trout Creek, near Polhemus, which is to the north of the project area. In the summer of 2002, White Spruce Gulch, an intermittent drainage in the WAA was surveyed for Preble's and none were found (S. Tapia, USFS Biologist, pers. comm.).

Only one stand (stand 14 of the Ridgewood Unit) may be within 300 feet of the 100-year floodplain, although it is all above 7,600 feet in elevation. Stand 14 will be modified to drop the lower end of the stand that may be within 300 feet of the 100-year floodplain, so no critical habitat is proposed for treatment under any of the alternatives. In addition, this action has the indirect effect of reducing the potential for moderate or high intensity wildfire.

Determination

The selected alternative would not adversely modify any critical habitat. As a result, the determination for this action for Preble's' meadow jumping mouse is "no effect".

MEXICAN SPOTTED OWL *(Strix occidentalis lucida)*

Natural History, Distribution and Effects

Historical records for the Mexican spotted owl in Colorado are very rare, and the historical distribution is very difficult in infer (Foster and Wheeler, 1999). This species has been located on the Pikes Peak, South Platte and San Carlos Ranger Districts on the PSI National Forest. Historic records include most of the Front Range. These include areas 10-20 miles to the southeast of the analysis area (CNHP 2001). The owl may be found on steep-sided canyons with old growth mixed conifer forests in southwestern Colorado. It may also be found in the shady, cool canyons of the pinyon-juniper zone. All nests in Colorado found to date occur on cliff ledges or caves along canyon walls (UFSF 2000). These include both sheer, slick rock canyons with scattered patches of Douglas-fir and steep canyons with exposed bedrock cliffs, with various tiers of exposed rock at various heights.

This species was listed in 1993.Critical habitat was designated in 1995, but USFWS removed that designation in 1998. In 2001, critical habitat was re-designated. Critical habitat has been mapped for this species but this mapping is currently being refined. The existing map identifies critical habitat (SRM-C-2) on the extreme north end of the Ridgewood Project Area, in Douglas County. It also included the extreme north end of the Trail Creek Area; this area has been dropped from the proposal because the area burned in Hayman wildfire. Within SRM-C-2, there are two Protected Activity Centers (PAC's): Thunder Butte and Devils Head. The Thunder Butte PAC was burned over in the Hayman wildfire, although much of the area was mapped as unburned on the BAER fire severity map. Both of these PAC's are outside of the project area.

There are some areas within the critical habitat boundaries, that do not, or cannot support the primary constituent elements, and are, by definition, not considered to be critical habitat, even though they are within the identified mapped boundaries (Fed. Reg.Vol 66, No. 22, Feb 1, 2001). For canyon habitat, the primary constituent elements include one or more of the following attributes: cooler and often more humid conditions than the surrounding area; clumps or stringers of trees and/or canyon wall containing crevices, ledges or caves; high percent of dead litter and woody debris; and riparian or woody vegetation (USFWS 2001). Foraging habitat generally has more big logs, higher canopy closure and greater densities of trees and snags than random sites (USFWS 1995). The Recovery Plan recommends managing foraging habitat thru the coarse-filter method; managing the land with the range of what would happen with natural processes and disturbances.

The only area of potentially suitable habitat near the Project Area was Missouri Gulch. This area was visited in the field in April 2002 by Forest Service and US Fish and Wildlife Service biologists. This drainage is wide, mostly forested, and has small, isolated rock outcrops, rather than cliffs. This area was determined to be potential, but very low quality habitat. As a result of the field review, Missouri Gulch and Trail Creek areas are not considered to provide Mexican spotted owl habitat (J. Peterson, USFWS

Biologist, pers. comm.). While the area is mapped as critical habitat, it does not have the primary constituent elements for canyon habitat, as identified above**.** In addition, this action has the indirect effect of reducing the potential for moderate to high intensity wildfire. Loss of habitat to wildfires was identified as one of the factors for listing this species (USFWS 1995). The recovery plan also includes direction for management of foraging areas; these areas are to be managed to move towards historical conditions. This action does that.

Determination

This action would not adversely modify any critical habitat. As a result, the determination for Mexican spotted owl is "No effect".

GREENBACK CUTTHROAT TROUT *(Onchorynchus clarki stomias).*

Natural History, Distribution and Effects

Historically, the greenback cutthroat trout was known to inhabit the Upper South Platte River. This species was believed to have been a common species historically. Habitat loss, habitat modification and hybridization with or displacement by non-native trout species has eliminated greenbacks from most of its native range. Greenback trout are listed as threatened under the Endangered Species Act. This species is now restricted to only seven small drainages on the Pike and San Isabel national Forest (USFS 2000) but is not found in the Project Area.

Determination

The determination for this action on greenback cutthroat trout is "no effect".

PAWNEE MONTANE SKIPPER *(Hesperia leonardus montana).*

Natural History, Distribution and Effects

This species was listed as threatened in 1987. The skipper occurs only on the Pikes Peak Granite Formation in the South Platte River drainage system in Colorado. The total known habitat within the range is estimated at 37.9 square miles (USFWS 1998). Surveys were carried out to the north of the analysis area for the Two Forks Reservoir. Those surveys found that much of the identified habitat was considered sub-optimal because of dense forest canopy cover and sparse ground cover (USFWS 2000).

The Pawnee montane skipper is found in sparsely wooded grasslands and open pine forests at elevations from 6,000 to 7,500 ft. They are dependent on two plant species, the prairie gayfeather (*Liatris punctata*), which flowers late summer through early fall and blue grama (*Bouteloua gracilis*). The butterfly uses liatris for its nectar and the blue grama as larval plant food (U.S. Fish and Wildlife Service 1998).

Recent conversations with the Scott Ellis, who has done surveys to the north of the Project Area conclude that his surveys were very thorough and that the existing map showing the upper elevational limit as 7500 feet is pretty accurate. The Project Area starts at 7600 feet and likely does not provide suitable habitat for this species (L. Ellwood, USFWS Biologist, personal communication), although there may be potential habitat on the extreme north end in the Trail Creek area.

Hayman wildfire burned thru Trail Creek in the area that had been identified as potential habitat. As a result of the wildfire, the Trail Creek Unit was dropped from this proposal. There is the potential that this area could reburn with a future wildfire, but the Proposed Action reduces the risk of stand-replacing wildfire in the larger analysis area.

Determination

All of the Trail Creek unit was dropped from the proposal following Hayman wildfire. Since the rest of the analysis area is outside of the range of the skipper, none of the alternatives will have any affect on potential habitat. As a result, the determination for the selected alternative for Pawnee montane skipper is "no effect".

BALD EAGLE *(Haliaeetus leucocephalus)*

Natural History, Distribution and Effects

Breeding bald eagles are rare in Colorado. Although some nesting does occur, most eagles migrate in summer to northern breeding grounds but return to lower latitudes during the winter. Winter habitat consists of roost trees along rivers and other large bodies of ice-free water that allow access to fish (USFS 2000). Communal, nocturnal winter roosts have been found around Cheesman Reservoir, well to the north and outside of the analysis area. Bald eagle roosts here were generally in large trees on hillsides within ¼ mile of Cheesman Reservoir. Much of the area around Cheesman burned in the Hayman wildfire in 2002. Monitoring around Cheesman Reservoir in the early winter of 2002/2003 found that there were about 20 eagles staying in the area, using an area of live trees that were unburned (J. Peterson, US Fish and Wildlife Service, pers. comm. 1/22/03). As of late March, there were about 25 eagles around Cheesman, half of which were juveniles. They were using burned trees as well, and are in an area that is pretty protected from the wind, so the trees may remain standing for awhile (J. Peterson, US Fish and Wildlife Service, pers. comm. 3/24/03).

There are no known communal, nocturnal roosts in the Analysis Area. Several years ago there were incidental sightings in the winter around Manitou Lake (S. Tapia, District Biologist, pers. comm.). Manitou Lake has been drained for work on the dam, but is currently filling and should be filled by mid-April. It could provide winter habitat once it is refilled and fish become reestablished or are transplanted.

Only one unit is located immediately adjacent to Manitou Lake (stand 29 of Long John Unit). This unit is not proposed for treatment under any of the alternatives as it is dominated by grasses. Stand 28, which is the nearest forested stand proposed for treatment, is within ¼ mile of Manitou Lake and could be used for roosting by bald eagles.

Under the selected alternative, stand 28, would be treated. This unit would be tractor yarded, to thin overstory and understory. Yarding occurring in the winter could cause disturbance and displacement of bald eagles that may roost in the area. This unit is within the one-mile buffer zone from urban interface, and landings or piles would be jackpot burned; there would be no broadcast burning. The resultant stand would still provide suitable roosting habitat after completion of the treatments.

Mitigation has been incorporated into this alternative. Since known winter roosts around Cheesman Reservoir were potentially affected by Hayman wildfire, it is not known where these eagles will spend winters over the long-term. Currently (winter 2002/2003) eagles were still using the Cheesman Reservoir area. There is the potential for eagles to disperse and look for new winter roosts. After Manitou Lake is re-filled, it would be monitored for two winters from December through February for concentrated use by bald eagles for nocturnal roosting. If roosts are found, a 1/8 mile radius "no forest management" protection zone would be applied, as well as a restriction of work activities within a one-mile radius from November 1 to March 30.

Cumulative Effects

Under the ESA, only future state, tribal or private actions that are reasonably certain to occur are considered. Future federal actions that are unrelated to this proposal would require separate consultation.

No actions are proposed at this time. Manitou Lake is within ¼ mile of Highway 67. Otherwise, the land around Manitou Lake is in public ownership. Recreational use around Manitou Lake could cause disturbance or displacement to roosting bald eagles in the winter. Generally the gate into the Picnic Area is closed during winter months, but walk-in use could occur. Any future changes in recreation management around Manitou Lake would go thru the NEPA process and would undergo consultation of needed.

<u>Determination</u>

Implementation of any of this alternative would result in a determination of "May Effect but not likely to adversely affect" for bald eagles.

VI. RECOMMENDED MEASURES TO AVOID, MINIMIZE, OR MITIGATE ADVERSE EFFECTS

Mitigation Measures or Project Modification

There are several modifications or mitigation measures that have been incorporated into the alternatives for threatened and endangered species. Stand 14 of the Ridgewood Unit has been modified to avoid any areas of potential Prebles' meadow jumping mouse habitat. Monitoring and future mitigation (if monitoring shows that it is needed) has been incorporated for bald eagles around Manitou Lake. Since known winter roosts around Cheesman Lake were potentially affected by Hayman wildfire, it is not known where these bald eagles will winter. Monitoring around Cheesman Reservoir in the early winter of 2002/2003 found that there were about 20 eagles staying in the area (J. Peterson, US Fish and Wildlife Service, pers. comm. 1/22/03). Once Manitou Lake is re-filled, surveys during winter months will determine if there is any concentrated roosting in the area in winter.

VII. RESPONSIBILITY FOR A REVISED BIOLOGICAL ASSESSMENT

This Biological Assessment was prepared based on presently available information. The Draft EIS and alternatives and the Draft BE have been modified to incorporate the effects of Hayman wildfire. If the Final implemented action is modified in a manner that causes effects not considered here, or if other new information becomes available that reveals that the action may impact endangered, threatened, or proposed species in a manner or to an extent that was not previously considered, a new or revised Biological Assessment would be required.

VIII. CONTACTS

There were several contacts, and sources used for this analysis. Phone conversations and a field trip were made with the US Fish and Wildlife Service (listed in the Consultation History section). In addition, USFS District Biologists Steve Tapia and Denny Bohon provided information.

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TROUT-WEST FUELS REDUCTION PROJECT

PIKES PEAK RANGER DISTRICT

Fish and Wildlife Existing Condition

Betsy Hamann 10/16/02

Fish and Wildlife Existing Condition

FISHERIES

Introduction

This section describes the fish and aquatic habitat that could be affected by the proposed actions. The Project Area's aquatic resources are divided into two habitats based on geographic location and differences in physical and biological attributes. These habitats are Trout Creek and its tributaries and West Creek and its tributaries. Fish species known to be present in the Analysis Area are listed in Table 1.

Table 1. Fish species known to be present in the Analysis Area.

Species	Scientific Name	Status	Known distribution
Longnose sucker	*Catostomas catostomas*	Native	Lower reaches of West Creek
White sucker	*Catostomas commersoni*	Native	Trout Creek
Longnose dace	*Rhinichthys cataractae*	Native	Unknown. Difficult to survey
Rainbow trout	*Oncorhynchus mykiss*	Introduced non-native	Manitou Lake (in past)
Brown trout	*Salmo trutta*	Introduced non-native	Phantom Creek
Snake River cutthroat trout	*Oncorhynchus clarkii*	Introduced non-native	Manitou Lake (in past)
Brook trout	*Salvelinus fontalis*	Introduced non-native	Higher elevations, relatively cold stream temperatures in small streams. Rule, Trout, Phantom and West Creeks.

There is one Forest fish Management Indicator Species (MIS) for this area, brook trout. Brook trout were selected as an MIS because of public concerns and interest for fishing. They are a non-native species that has been introduced. They spread quickly throughout Colorado mountain streams, competing directly with native cutthroat trout species. Brook trout have displaced native trout from most of Colorado's high mountain streams (USFS 2000).

Rainbow trout and Snake River cutthroat trout have also been stocked in the Analysis Area, in Manitou Lake, South Platte River, and in private ponds in West Creek (P. Gallagher, Fisheries Biologist, pers. comm.).

Green-Backed Trout (*Oncorhynchus clarki stomias*)

Historically, the longnose sucker, white sucker, longnose dace, and greenback cutthroat trout were known to inhabit the Upper South Platte River. The greenback cutthroat trout, believed to have been a common species historically, is no longer found in the Project Area. Habitat loss, habitat modification, and hybridization with or displacement by non-native trout species has eliminated greenbacks from most of its native range.

Greenback cutthroat trout are listed as threatened under the Endangered Species Act. This species is now restricted to only seven small drainages on the Pike and San Isabel National Forest (USFS 2000), and does not occur in the Project Area.

Description of Aquatic Habitats

Trout Creek

This creek was noted historically as an important trout fishery but today supports only a marginal fishery. This is a result of habitat degradation from flooding, overgrazing, and human community development upstream (Winters et al. 1992). Sediment and stream temperatures have been identified as issues. High stream temperatures due to a lack of shading appeared to be a major limiting factor of this fishery. Trout Creek is very unstable due to highly erosive granitic soils. Trout Creek has been placed on the 303(d) list for sediment. Most sediments from the headwaters are trapped in Manitou Lake. Manitou Lake is currently drained and is being deepened. In addition, a deep-water release valve is being installed to allow release of cooler water downstream. This project should be completed in the summer of 2003.

Monitoring in Trout Creek was done in 1992 to determine the extent that past stream bank structural improvements have had on the creek and to assess impacts occurring due to sediment deposition as a result of breached beaver dams recently built within the channel. This monitoring showed marked amounts of eroding banks and increases in sediment deposition. This system appears very unstable and is easily impacted; factors which result in stream channel movement and vegetation removal should be minimized (Winters et al. 1992).

Additional monitoring in 1994 found an increase in eroding banks and sediment deposition. This has reduced the amount of habitat available for trout by filling in pools or has allowed the stream to create new channels. Stream stabilization structures do not appear to have been effective. Management activities that promote the health of the riparian zones and streamside vegetation are the only methods that have shown limited success in this area (Gallagher et al. 1994).

Temperature may be the most significant factor affecting fish because it affects dissolved oxygen content. Stream temperatures warm as channels get wider, gradient drops, and velocity and sediment load increases. Above Manitou Lake, temperature limits were exceeded 8% of the time, but the most severely impacted areas are below Manitou Lake (Gallagher and Saulter 1998). Three sites on Trout Creek were monitored for temperatures in 1995. Average temperature was approximately ten degrees warmer in the downstream stations than the upstream stations, partly due to lack of stream shading on the downstream sections, but also probably due to surface warming of water at Manitou Lake (Gallagher and Winters 1995). Existing conditions from Project Area streams are listed in Table 2.

Table 2. Existing conditions from selected streams within the Project Area (Wagner 2002).

Stream reach	Population trend*	Biomass LB/AC	Stream Cover	Bank Conditions**	Willow conditions	% time temperature exceeded
Trout	Down	23/poor	Poor		poor	26%
Rule	N/A		Poor	100%	Good-poor	
Phantom	N/A	23/poor	poor		poor	26%
West	N/A	0/poor	fair	100%	fair	

* Population trend information is for brook trout

** Percent of sampled reaches that meet the bank stability standard of 80%

Rule Creek was inventoried in 1993 to quantify the effects of recreational use (motorized trail bike and ATV) on the fishery. Only 3% of the reaches total area would be considered cover; this small percentage of cover to total area, and the degraded conditions in which the cover existed, were not providing a healthy fishery (Gallager et al. 1993). Streambanks are eroded, and the streambed consisted of a relatively even distribution of sand/silt and gravel, which is not conducive for spawning and reduces the primary in-stream food source. A resident population of brook trout did exist in the stream, but this species is relatively resilient to sedimentation impacts. Continued degradation could eventually limit this resilient species. Efforts have been underway to mitigate some of the damage. In the summer of 2002, the Hayman wildfire burned 9% of the Trout Creek watershed. About 46% of the burned area was burned as a stand-replacing fire.

West Creek

Trail Creek, which is a tributary to West Creek, has been placed on a monitoring and evaluation list for sediment. This was done because there are concerns, but there is not currently enough information to determine the need for 303(d) listing.

In the summer of 2002, the Hayman wildfire burned about 56% of the West Creek watershed. About 44% of the burned area burned as a stand-replacing fire.

Roads

Roads and stream crossings can influence aquatic habitat quality in several ways. They may cause changes in hydrology, increase surface erosion, create barriers for fish passage, facilitate introduction of non-native species, affect streamside plant communities, introduce pollutants, and increase access for fishing (USFS 1999). The project area lies in granitic parent material and is very susceptible to erosion. Sedimentation in area drainages has been identified as a problem. Factors that affect rates of sedimentation in the Project Area are listed in Table 3.

Table 3. Factors affecting sedimentation rates. *(see Soil and Water section of the EIS for more information)*

Watershed	Miles native surface road within 300' of streams	Road densities in watershed	Number of perennial stream crossings
Trout Creek	88 miles	4.12 mi/mi2	181
West Creek	42 miles	3.56 mi/mi2	112

A portion of the roads within 300 feet of streams are also within 100 feet of the stream. Where roads are close to the stream, they may reduce shading and litterfall into the riparian areas. Reduced shading results in increases in stream temperatures, and reduced litterfall affects nutrients and foraging habitat.

No analysis has been done to assess if culverts are barriers, but the fact that brown trout are found in most of the major West Creek tributaries may indicate that this is not a problem (P. Gallagher, District Fisheries Biologist, pers. comm.). Gallagher stated that the bigger concerns are road and trail crossings, Phantom Creek crossings, and numerous crossings on Trail 717.

The current road system provides access for fishing across most of the Project Area. Currently, this has not been identified as a problem and over-fishing or poaching are not issues. Non-native species are widespread and the road system is not believed to be a factor at furthering the spread of non-natives.

Whirling disease

Whirling disease was discovered in Colorado in 1987 and is found in the South Platte Watershed. It is chiefly spread by infected fish or fish parts, but may also be spread by fisherman or other people moving from infected waters to uninfected waters. There is currently no information on how widespread whirling disease is in the Analysis Area. Roads may facilitate the spread of this disease as fishermen or other people can move infected fish, mud etc into other areas.

WILDLIFE

Introduction

This section first discusses the existing condition for major wildlife habitats and the general wildlife species present on National Forest Lands in the Project Area. Then Forest Plan Management Indicator Species (MIS) are discussed.

Species that are protected as threatened or endangered, or those on the United States Forest Service (USFS) Region 2 Sensitive species list for the Pike and San Isabel National Forest (excluding the Grasslands) are listed here but discussed in detail in the Biological Evaluation.

Analysis Areas

The area used for this analysis is based on Diversity Units, as identified in the Pike Forest Plan. There were originally nine Diversity Units (DUs) affected by the project. As a result of Hayman wildfire, some areas of proposed treatments were dropped and only seven of the nine DUs would actually be affected by the revised proposal. However, because of their location and distribution, the seven DUs did not make a logical boundary for analysis. All nine DUs were used because they made a logical geographical boundary. The DUs involved are 918-925 and 930; this area is referred to as the Wildlife Analysis Area (WAA). A map of the DUs is found in the project file. The WAA is about 60% of the Trout and West Creek watershed Analysis Area.

Table 4. Affected Diversity Units included in the Wildlife Analysis Area (WAA).

Treatment Area	Diversity Units affected
Phantom	920, 921 (only 585 acres affected)
Ryan Quinlan	919, 920, 923 (only 218 acres affected)
Ridgewood	925, 930
Long John	918, 919, 925
Rampart	918, 925
Skelton	919

The cumulative effects analysis area is the Trout Creek and West Creek watersheds.

General Wildlife Discussion

Wildlife Species

The following discussion identifies groups of wildlife and major habitats and habitat components that are known to occur in the WAA. These groups include game species, predators, small mammals, and birds. Management Indicator Species (MIS) are also discussed.

Game Species

Game species that occur in the WAA include elk, mule deer, wild turkey (*Meleagris gallopavo merriami*), redhead (*Aythya americana*), mourning dove (*Zenaida macroura*), Canada goose (*Branta canadensis*), and common merganser (*Mergus merganser*) (Fitzgerald et al. 1994). Black bear (*Ursus americanus*) also occur. Elk and mule deer are discussed further in the MIS section.

Predators and Small Mammals

There are a few mammalian predators present in the WAA, including the coyote, red fox, mountain lion, and bobcat. Predators have been increasing, and there have been problems in the urban interface area, where inadequate garbage and attractant handling has drawn predators into residential areas (B. Davies, CDOW, pers. comm.). Predators typically have a large home range that they will travel in short amounts of time. Predators are dependent on small mammals and small birds as prey items. Therefore, habitat has to be able to support their prey. CDOW maps show the southern half of Ryan Quinlan and Phantom treatment units as black bear concentration areas.

Small mammals that occur in the Project Area are typically prey items to large mammalian predators and birds of prey. Small mammals typically feed on plants, berries, and invertebrates. Abert's squirrels are discussed further in the MIS section.

Landbirds

Birds are the most diverse wildlife group in the WAA. Based on the list of species known or likely to occur in Teller County (NDIS), there are a total of 153 species. Twenty-one of these are waterfowl or colonial waterbirds, leaving 132 species of landbirds. Eighteen are hawks and owls, while many of the remainder are passerine (songbirds). Not all of the species listed for Teller are expected to be found in the WAA, as associated habitats are not present.

The *Colorado Breeding Bird Atlas* (Kingery 1998) states that the ponderosa pine ecosystem supports more bird species than any other forest ecosystem in Colorado. Pygmy nuthatches, western bluebirds, and grace warblers breed almost exclusively in ponderosa pines. Hejl et al. (1995) list flammulated owls, Mountain Chickadee, Pygmy Nuthatch, Western Bluebird, Grace's Warbler, dark-eyed junco, yellow-eyed junco, and pine siskins as being the most abundant species in ponderosa pine forests.

Studies (e.g, Szaro and Balda 1982) have studied birds in ponderosa pine forests of northern Arizona and they concluded that the two species that indicated the overall "health" of the bird community were the pygmy nuthatch and violet-green wwallow. They based this finding on the fact that when they found high densities of these species, they also found high densities of most of the other ponderosa pine forest bird species. Mountain bluebirds, flammulated owls, and pygmy nuthatches are discussed further in the MIS section or the Biological Evaluation.

Major Vegetation Types/ Habitats

There are four major vegetation types in the WAA: coniferous forest, aspen, grassland, and shrubland (Table 5). Riparian habitats are also important, but are not included in the table below as they were not mapped out in the Forest GIS vegetation layer used here. The WAA is dominated by the coniferous vegetation, which covers over 91 percent of the area (Table 5).

Table 5. Major Vegetation Types and their Occurrence in the Wildlife Analysis Area.

Vegetation Type	Area (acres)	Area (%)
Coniferous Forest	70,417	91
Aspen	1,452	2
Grassland	4,492	6
Shrubland	1,163	1
Totals:	77,679	100

Coniferous Forest

The majority of the habitat in the Project Area is coniferous forests. These forests are dominated by ponderosa pine and Douglas-fir. They range from open ponderosa pine to dense Douglas-fir stands mixed with ponderosa pine. Ponderosa pine sites typically are drier than Douglas-fir sites; however, they can form a mixed pine/fir forest (Fitzgerald et al. 1994). Aspen is often a component of these areas.

The forested stands within the WAA typically have a closed canopy. Based on Forest RIS data, canopy coverage of the forested areas are distributed as shown in Table 6, below.

Table 6. Forested Habitat Types (includes conifer and aspen) and % of area in the Wildlife Analysis Area by Canopy Coverages **before** Hayman wildfire.

Forested cover types	Acres	Percent
0-10% canopy closure	6,300	8%
11-40% canopy closure	7,340	9%
41-70% canopy closure	48,940	63%
71-100% canopy closure	10,070	13%

Table 7. Forested Habitat Types (includes conifer and aspen) and % of area in the Wildlife Analysis Area by Canopy Coverages **after** Hayman wildfire.

Forested cover types	Acres	Percent
0-10% canopy closure	17,242	22%
11-40% canopy closure	7,339	9%
41-70% canopy closure	39,637	51%
71-100% canopy closure	8,147	11%

As is shown in the above tables, the Hayman wildfire resulted in an increase in open, early seral stands (went from 8% to 22%) and a decrease in closed canopy stands. However, the WAA still has 62% of the area in forested stands with canopy cover over 40%.

Common understory vegetation in these types include cliffbush *(Jamesia americana),* common juniper *(Juniperus communis),* kinnikinnik *(Arctostaphylos uva-ursi),* squaw current *(Ribes cereum)*, shrubby cinquefoil *(Potentilla fruticosa),* woods rose *(Rosa woodsii),* yucca *(Yucca glauca)*, bluegrass *(Poa sp.),* mountain muhly *(Muhlenbergia montana),* and bromes (*Bromus* sp.) (Reynolds et al. 1985).

Species that feed on ponderosa pine include the following: caterpillars and aphids on needles; beetles and caterpillars on cones; tent caterpillars, porcupines, bark beetles, sapsuckers, and Abert's squirrels on phloem or sap.

Mistletoe is present across the WAA. While mistletoe affects tree growth, seed production and may cause death of the tree, it is an important component of healthy forests. Bennets et al. (1996) found that bird abundance, species richness, and snag densities are all positively associated with the presence of dwarf mistletoe. It may enhance nesting opportunities; witches brooms may provide nest platforms and may provide concealment for the nest. In addition, it may enhance insect populations of species that feed on or pollinate mistletoe, or those that may take advantage of the weakened condition of infected trees. These insects then provide a prey base for many bird species.

Several species being analyzed for this project are known to use dwarf mistletoe. Hawksworth and Geils (1996) found several species of birds using mistletoe for food. These include one of the Forest MIS, the mountain bluebird. Bird species that were found to nest in witches brooms include Mexican spotted owl and goshawk. Mammals that were found to feed on mistletoe include Abert's squirrel and mule deer. Those using it for nesting cover include Abert's squirrel.

Aspen

The majority of the pure aspen stands occur on the south and east sides of the WAA, in the Phantom, Skelton, and Long John treatment units. This forest generally has a rich understory of shrubs and forbs. Aspen is also found as a component in conifer-dominated stands, where it is slowly being shaded out and out-competed by conifers.

Snags

Reynolds et al. (1985) gathered information on snags, spike-topped trees, and live trees with cavities over 160 hectares of the Manitou Experiment Station. They found that ponderosa pine and Douglas-fir are important snag species on all slopes and aspects. Aspen is especially important in moist bottoms. They found that there were an average of six snags or spike-topped trees per hectare (2.5 trees/acres). Of these, about 13% of the snags and 34% of the spike-topped trees had cavities.

Riparian

In 1997, a riparian inventory was conducted over the Forest (Table 8). For the nine DUs in the WAA, shrub riparian habitats were the most abundant types.

Table 8. Riparian vegetation in the Wildlife Analysis Area.

Dominant vegetation in riparian zone	Percent of riparian habitats
Shrub	33%
Conifer	16%
Aspen	13%
Deciduous/Conifer	10%
Conifer/shrub	6%
Grass	6%

Shrublands

Shrublands within the WAA are typically dominated by rabbitbrush, snowberry, and mountain mahogany (*Cercocarpus montanus).* Shrublands typically occur higher than grasslands and below deciduous forests on rocky, coarse, and well-drained soils. They typically are very diverse ecosystems. Common plants in moist areas of shrublands are wax currant (*Ribes cereum*) and gooseberry (*Ribes inerme*) (USFS 2001).

Grasslands

Grasslands are generally interspersed with other types. Most mountain grasslands support, or are capable of supporting numerous perennial grasses and forbs (USFS 2001). These habitats typically have short grasses like blue grama, side oats grama (*Bouteloua curtipendula),* little bluestem *(Schizachyrium scoparium*), and Idaho fescue (*Festuca idahoensis*) (Fitzgerald et al. 1994). These areas are typically very diverse and have both grasses and forbs. They generally occur in basins or areas where the soil, precipitation, and temperature are unsuitable for tree growth (Upper South Platte EA).

Rock Outcrops

This habitat component is fairly limited in the WAA. There are small rock outcrops immediately north of Missouri Gulch, rock outcrops in Trail Creek, and rock slides on Signal Butte.

Caves and Abandoned Mines

There are no caves in the WAA. There are a few abandoned mines. These were surveyed in 1994; 19 sites were surveyed on the District. One adit on Rule Creek was found to be used by bats.

Roads

Roads and resultant human access can also influence wildlife use in an area. Roads may access unique habitats, spread weeds, cause fragmentation of habitat, and provide access for human activities that affect habitat (firewood gathering); they increase access for hunting, trapping, poaching, and may result in roadkill (USFS 1999; Wisdom et al, 2000).

Currently poaching is not thought to be a problem in the WAA (Vayhinger, CDOW Biologist, pers. comm.). Elk are known to cross highway 67 around Rainbow Falls and some conflicts could occur there (Vayhinger, CDOW Biologist, pers. comm.), but that area is outside of the WAA.

Some of these impacts can also result from motorized trails. Table 9 shows road and motorized route densities (including trails) for the six treatment units.

Table 9. Open road and route densities for the six Treatment Units.

Treatment Unit	Road density	Route density
Long John	6.0 mi/mi2	7.0 mi/mi2
Phantom	2.9 mi/mi2	4.2 mi/mi2
Rampart	5.2 mi/mi2	5.6 mi/mi2
Ridgewood	2.7 mi/mi2	2.7 mi/mi2
Ryan Quinlan	2.9 mi.mi2	3.4 mi/mi2
Skelton	2.6 mi/mi2	4.3 mi/mi2

Management Indicator Species (MIS)

The species discussed below (Table 10) are those identified as management indicator species (MIS) in the Forest Plan that may occur within the Project Area. These species are considered to be important indicators of forest health or important game species. The tool used for determining habitat capability for this assessment is the HABCAP model. This model provides estimates of the capability of habitats to support wildlife based on the mix of vegetation cover types and structure present in the area (USFS 1994).

Species that are both MIS and Sensitive species are discussed in the Biological Evaluation (i.e., Lewis' woodpecker, peregrine falcon and three-toed woodpecker). MIS representing habitats not in the project area are not included in this analysis (pine marten for subalpine forests, black-throated gray warbler for pinyon-juniper, Virginia's warbler for oak habitats, and water pipit for alpine tundra).

Table 10. Forest MIS Potentially Occurring in the Project Area.

Species	Scientific Name	Habitat represented*
Mammals		
Abert's squirrel	*Sciurus aberti*	Ponderosa pine
Beaver	*Castor canadensis*	Riparian
Elk	*Cervus elaphus*	Semi-open coniferous forests, shrublands
Mule deer	*Odocoileus hemionus*	Semi-open coniferous forests, shrublands
Birds		
Lewis' woodpecker	*Melanerpes lewis*	Riparian forests
Mallard	*Anas platyrhynchos*	Water
Mountain bluebird	*Sialia currocoides*	Mountain grassland
Peregrine falcon	*Falco peregrinus*	Cliff habitats
Red-naped sapsucker	*Sphyrapicus nuchalis*	Aspen forests
Three-toed woodpecker	*Picoides tridactylus*	Coniferous forests
Wild turkey	*Meleagris gallopavo*	Mature ponderosa pine
Green-tailed towhee	*Pipilo chlorurus*	Sagebrush
Wilson's warbler	*Wilsonia pusilla*	High elevation riparian

*Sources: Fitzgerald et al. 1994 and Kingery 1998.

A recent review of the current MIS has recommended several changes. If these changes are made, beaver, mule deer, elk, mallard, water pipit, green-tailed towhee, turkey, black-throated gray warbler, and Virginia's warbler would be dropped. The predominant rationale for recommending dropping these species is that population trends cannot be determined at the Forest level (USFS 2002).

Abert's squirrel. Abert's squirrel distribution is from extreme southern Wyoming to the lower mountains of New Mexico and Arizona, with outlying populations in Mexico. This species is ecologically dependent on ponderosa pine for both nesting and foraging. Target feed trees represent less than 10% of the trees in stands used by Abert's squirrels and are chemically and physiologically different from trees not selected (Fitzgerald et al. 1994). Approximately 92% of the nests were in a tree group with 75% having three or more interlocking tree canopies. Home ranges are from 5 to 20 hectares, depending on the season and sex of animals.

The state population trend is suspected to be stable or increasing (USFS 2001). The NDIS database shows that the species is "fairly common" in these three counties (Teller, Douglas, and El Paso). Population dynamics are poorly known, but are believed to fluctuate widely over time and space, possibly due to cyclic variations in biomass of pinecone crops (USFS 2001).

Populations are sufficiently abundant to withstand some hunting in Colorado, Arizona, and New Mexico. Colorado harvest data from 1999 shows that 253 squirrels were harvested in Teller, El Paso, and Douglas counties (CDOW website).

Habitat on the Forest has probably increased over historic conditions due to fire exclusion but is currently declining from the effects of insect and fire-related activity (USFS 2001). The Forest Plan includes standards and guidelines for protection or providing nest tree clumps in sale areas. Discussions in a recent workshop (4-17-10) highlighted the importance of patchiness for Abert's squirrel; evenly spaced trees are not desired.

Beaver. Beaver commonly inhabit riparian areas of mixed coniferous-deciduous forests and deciduous forests containing abundant foods and lodge-building materials such as aspen, willows, alders, dogwood, and cottonwoods. As mentioned under the riparian section, about 1/3 of the riparian vegetation is a shrub type. Based on review of topographic maps, most of the historic and/or current beaver complexes are in the Phantom treatment unit, on Phantom Creek, South Fork Davis Creek, Spring Creek, Long Gulch, Crazy Gulch, and West Creek.

Beavers and dams trap sediment, reduce stream velocity, elevate water tables, and reduce effects of seasonal fluctuations in the water table. They also encourage growth of willows and riparian plants, stabilize banks, and improve riparian and aquatic habitat (Olson and Hubert 1994). Organic debris dams trap dissolved and particulate matter. In an experiment, dam removal brought about a 6% increase in export of dissolved material and a 500% increase in the export of both fine particulate and coarse particulate matter (Bilby 1981, in Medin and Torquemada 1988).

Colorado beaver populations have experienced declines from historic conditions but have increased or stabilized in the last several decades (USFS 2001). A 1993 analysis (Flather et al. 1999) suggests that beaver numbers exceed habitat carrying capacity for the state of Colorado, with stable population projections. Population size estimates are available through trapping records. Beaver harvests between 1987 and 1996 for the 13 counties that encompass the Pike and San Isabel National Forests do not show any real trends, if harvest data does reflect population trends. Most beaver trapping was stopped after Colorado's Amendment 14 passed in 1996 (USFS 2001). Currently, most of the available habitat is occupied and CDOW Biologists have a hard time identifying areas to relocate beaver (J. Veyhinger, CDOW Biologist, pers. comm.).

Elk. Because elk have a wide distribution, their preferred habitat also varies widely. During summer, elk spend most of their time in high mountain meadows in the alpine or subalpine zones or in stream bottoms. Elk may use more open areas during spring and summer because of earlier spring green-up. During hot summer months, elk seek shaded, cool habitats (USFS 2001). The entire Project Area is elk summer range. Aspen stands, riparian areas, and north aspects provide cooler, moister habitats in the summer. The CDOW has mapped the southern end of the Rampart Unit as an area that receives concentrated use in the summer. The CDOW has mapped "elk production areas" (calving areas); areas that overlap with units are the southeast side of Skelton, and the southern portion of the boundary line between Phantom and Ryan Quinlan treatment units. These are only known areas and do not include all calving areas.

In severe winter weather, many animals substitute an energy conservation strategy rather than focusing on forage uptake (Christensen et al. 1993). While thermal cover is important in some areas, it is not as important in this area due to mild winters and light snow cover. Winter surveys often find most of the elk wintering on open flats at 9,000 to 10,000 feet (J. Veyhinger, CDOW Biologist, pers. comm.). CDOW has mapped the lower portion of Ridgewood, north end of Long John, northeast part of Ryan Quinlan, and extreme southern ends of Phantom and Skelton treatment units as winter range. Winter concentrated use areas are mapped as the extreme northwestern portion of Ridgewood and the extreme southwestern edge of Rampart. These areas may be used in harsher winters.

A map of these seasonal elk use areas is found in the Project File.

This species is intensively managed and there is good data available on population size and trends. Elk are expanding their range due to reintroductions, management and habitat conversion. The Project Area lies in Game Management Unit (GMU) 511, with a very small amount in GMU 51. GMU 511 is managed as part of the 11-Mile Elk Herd, which includes several other GMUs. The long-term population objectives for this herd are 1180 animals; post season counts in 2001 estimated 1830 animals. It is felt that the objective was set too low and will probably be raised in the future. Currently it is hard to keep numbers down due to complex land ownership patterns and subdivisions; private lands and Ft Carson act as refuges where no hunting is allowed. There are currently around 23 bulls, 100 cows, and 48-50 calves, meeting state population objectives (J. Veyhinger, CDOW Biologist, personal communication). While the Project Area is very accessible, the area does not have a problem with poaching. However, the high accessibility contributes to displacement of elk onto adjacent private lands.

Elk frequently cross Highway 67 around Rainbow Falls, to the north of the Project Area.

Mule deer. Mule deer are most likely to be found in open forested regions or on the plains and prairies. They prefer rocky or broken terrain at elevations near or at the subalpine zone in the mountainous regions of the west. Mule deer seek shelter at lower elevations when snows become deep (USFS 2001).

CDOW has mapped the whole Project Area as year-round range. The extreme northeastern corner of Ridgewood treatment unit has been mapped as critical winter range. This map is found in the Project File.

USFS (2001) states that the Colorado mule deer population increased between 1975 and 1983, then stabilized after 1993. The Project Area lies in the Rampart Data Analysis Unit. The population objective for this unit is 3,000 deer and currently the population is at that number (B. Davies, CDOW Biologist, pers. comm.). The buck to doe ratio objective is 40 bucks per 100 does and currently it is at 50:100, well above the objective.

Lewis' Woodpecker. This species is also a Sensitive Species. See the Biological Evaluation for information.

Mallard. This species was selected as an MIS for water habitats. They are very adaptable and have few specific requirements: enough dry ground for nesting away from the waters edge and water for feeding. In the southern Rocky Mountains this species inhabits low elevation mountain lakes and streams, marshes, and ponds (USFS 2001).

Waterfowl have been counted in extensive and systematic surveys of major North American breeding grounds. The Breeding Bird Survey reported an upward trend (+3.5%) for mallards from 1966 to 1998.

Mountain Bluebird. This species is a secondary cavity nester and uses open woodland or edge habitat. They will nest in natural cavities, old woodpecker cavities, or in nest boxes. Nest site availability is a limiting factor in mountain bluebird productivity. They perch on dead branches near open areas with sparse ground cover, feed on insects on the ground, and are closely associated with early post-fire conditions (USFS 2001).

This species is considered abundant. Breeding bird surveys from 1966-1998 in the Southern Rockies Province and in Colorado indicate an increasing but non-significant trend.

Peregrine Falcon. This species was de-listed from the Federal T&E list in 1999 and is now considered a Forest Service sensitive species. This species will be discussed in the Biological Evaluation.

Red-Naped Sapsucker. This species uses open forest and forest edges. They are found primarily in coniferous/deciduous forests that include aspen and cottonwood. They nest in cavities in live trees, often near water. They will often return to nest in the same tree, but not in the same cavity, year after year. Adept at drilling sap wells, these birds carry sap in their crops to feed their nestlings and teach them to "sapsuck" shortly after fledging. This species feeds mainly on sap, pine pitch, cambium, and some insects and berries (Alsop 2001).

There is no information available to indicate a population trend for this species (USFS 2001). Breeding bird surveys and Christmas bird counts do not specifically address this species.

Three-Toed Woodpecker. This species is also a Sensitive Species. See the Biological Evaluation for more information.

Wild Turkey. Turkeys have been introduced to almost every state outside of its historic range. Turkeys now occupy their entire original habitat and now occur in virtually all suitable habitats in Colorado (Kingery 1998).

Two subspecies occur in the Forest: Merriam's and Rio Grande. Merriam's turkeys have their highest populations within its historical range in the southern part of the state, but they also occur in the central and western areas of the state. Rio Grande turkeys are most common in the Arkansas River Valley along rivers, where they were introduced for hunting opportunity. Merriam's is the subspecies present in the Project Area and is the subspecies that will be considered (USFS 2001).

Wild turkey need mature, open forests interspersed with grassy openings. Amount of openings required varies from 10-25% of total occupied range. Scarcity of suitable roost trees may be a limiting factor (USFS 2001). Roost trees are typically groups of over-mature trees in uneven-aged stands, usually on easterly slopes sheltered from wind. Ponderosa pine are preferred habitat when they have the following characteristics: 16-42" dbh, 50-100 feet tall, 75% flat-topped mature or older trees. There is one known turkey roost site in the Ryan Quinlan treatment unit. Turkey must be near water on a daily basis, and nests are usually within ½ mile of water. Of the six treatment units, Rampart and Ryan Quinlan have been identified as getting the most use by wild turkeys (M. Storey, National Wild Turkey Federation, pers. comm.).

Green-tailed towhee. This species breeds in shrubby hillsides dominated by Gambel oak and associated shrub species at an average 7,300 feet elevation. They also breed in sagebrush flats, ponderosa pine savannah with shrub understory, scattered aspen with shrub intermixed, and pinyon-juniper hillsides (USFS 2001).

Colorado contains between 20 – 40% of the breeding population of green-tailed towhees. This species ranks as the thirteenth most numerous species in Colorado with almost one million breeding pairs (USFS 2001). This species is monitored by Colorado Bird Observatory's "Monitoring Colorado's Birds" program using point counts.

Wilson's Warbler. This species is an MIS for high elevation riparian habitats. It is a fairly common summer resident in mountain parks and higher mountains (10,000-13,000 feet) (USFS 2001). The *Breeding Bird Atlas* states that this species breeds from 6,000 to 12,000 feet. They nest in willow and alder thickets of stream banks, lakeshores, and wet meadows (USFS 2001). The elevations in the Analysis Area range from 7,600 to 9,300 feet and are within the elevational range used by this species.

Breeding Bird Survey data in the Southern Rocky Mountain Province during 1966 to 1996 do not show a statistically significant annual rate of change. This species is monitored by Colorado Bird Observatory's "Monitoring Colorado's Birds" program using point counts.

Threatened, Endangered, and R2 Sensitive Species

Many species that potentially occur in the Project Area are protected as threatened or endangered, or are listed on the Forest Service (USFS) Region 2 Sensitive species list. The USFWS provided a species list for the Project Area, and this was used to identify threatened, endangered, and candidate species to be considered (USFWS 3/13/02).

The following table presents those TES species that potentially occur in the WAA. A thorough discussion of the habitat requirements for the TES and likelihood of occurrence in the Project Area can be found in the Biological Evaluation.

Table 11. TES Wildlife Species Potentially Occurring in the Project Area.

Species	Scientific Name	State Status	Federal Status	Forest Status
Mammals				
Dwarf shrew	*Sorex nanus*			S
Fringed-tailed myotis	*Myotis thysanodes pahasapensis*			S
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	T	T	
Ringtail	*Bassariscus astutus*			S
Towsend's big-eared bat	*Plecotus townsendii*			S
Black-tailed Prairie Dog	*Cynomys ludovicianus*		C	
Birds				
Bald eagle	*Haliaeetus leucocephalus*	T	T	
Black tern	*Chlidonias niger*			S
Flammulated owl	*Otus flammeolus*			S
Fox sparrow	*Passerella iliaca*			S
Golden-crowned kinglet	*Regulus satrapa*			S
Lewis' woodpecker	*Melanerpes lewis*			MIS, S
Merlin	*Falco columbarius*			S
Mexican spotted owl	*Strix occidentalis lucida*	T	T	S
Northern goshawk	*Accipiter gentilis*			S
Olive-sided flycatcher	*Contopus borealis*			S
Osprey	*Pandion haliaetus*			S
Peregrine falcon	*Falco peregrinus*			MIS, S
Pygmy nuthatch	*Sitta pygmaea*			S
Three-toed woodpecker	*Picoides tridactylus*			MIS, S
Invertebrates				
Pawnee Montane Skipper	*Hesperia leonardus montana*		T	
Amphibians and Reptiles				
Boreal toad	*Bufo boreas boreas*	E		S
Northern leopard frog	*Rana pipiens*			S
Tiger salamander	*Ambystoma tigrinum*			S

MIS = Forest Management Indicator Species, S = R2 Sensitive Species, T = Threatened, E = Endangered, C = Candidate

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TROUT-WEST FUELS REDUCTION PROJECT

PIKES PEAK RANGER DISTRICT

Fish and Wildlife Environmental Consequences

Betsy Hamann 11/22/2002

FISH AND WILDLIFE ENVIRONMENTAL CONSEQUENCES

FISHERIES

Introduction

The Project Area lies in granitics and sedimentation is naturally high in the watershed. The harmful effects of sediments on fish habitat have been well documented. Suspended sediment can affect aquatic organisms by killing them directly, by reducing growth rates and resistance to disease, by preventing successful development of eggs and larvae, by modifying natural movement or migration patterns, or by reducing the natural availabilities of food (Marcus et al. 1990).

Deposition of fine sediment can affect survival of salmonids (1) during intergravel incubation of eggs and alevins; (2) as fingerlings; and (3) throughout the winter. Timing, source, and quantity of deposited sediment can affect survival (Marcus et al. 1990).

Despite evidence of adverse effects from high concentrations of suspended sediment, fish may thrive in naturally turbid waters. Brook trout (a Management Indicator Species [MIS]) have been shown to be fairly resilient to sedimentation.

Results from sediment modeling are used to evaluate the various alternatives for sediment production.

Regulations and Policies

The Forest Plan has some specific goals, and standards and guidelines that are directed at fisheries. They include the following:

- Improve fish habitat on suitable streams and low elevation ponds and lakes.

- Protect riparian areas and wetlands from degradation.

- Manage fish habitat, which is providing a fishery at or near its potential, to maintain fish populations at existing levels. Manage fish habitat that is determined to be limiting a fish population to a level below its potential to improve habitat conditions that may be limiting.

- Maintain habitat for viable populations of all existing vertebrate wildlife species.

General Effects By Management Activity

Timber Harvest

Timber harvest can influence riparian habitats in a few ways. The mechanical disturbance may increase sediment moving into the stream. The use of mechanical equipment may increase the potential for pollutants to enter the stream. Vegetation removal may alter streamflows. Harvest within or adjacent to riparian zones (depending on aspect and slope) may result in decreased shading of the stream and increased water temperatures.

Marcus et al. (1990) reviewed numerous papers on the effects of timber management and concluded that, in general, most timber management activities have less impact on fisheries habitat than do roads.

Prescribed Fire

Use of prescribed fire can influence vegetation composition, density, size, amount, and distribution. For a short time after treatment, the increased amount of bare soils could result in an increase in erosion and deposition into the stream. The actual nature of the impacts depends on the site, soils, climate, intensity, and post burn recovery of vegetation (Marcus et al. 1990). If the fire is allowed to burn into the riparian zone, it may affect streamside vegetation, reducing shading and increasing water temperatures.

Roads

Roads influence aquatic and riparian zones and water quality in several ways. These includethe following: changes in hydrology, generation of surface erosion, generation of mass wasting, input of pollutants from roads, changes in terrestrial and aquatic interactions in streams and wetlands, migration and movement barriers, introduction of non-natives, and direct effects of fishing, collecting, and poaching (USFS 1999).

The riparian areas accessed by existing roads, proposed new temporary roads, and roads planned for restoration are not known to have areas of exceptionally high aquatic diversity.

Analysis of Alternatives

All alternatives have some risk of wildfire. The action alternatives show an increase in sediment over the short-term, but over the long-term sediment decreases. An indirect effect of the action alternatives is reducing the risk of wildfire in the two watersheds. These effects are discussed by alternative.

Roads and stream crossings have an effect on sediment. The alternatives vary in the miles of road that would be rehabilitated following project activities. Alternatives A, C, and E and the Proposed Action would be most effective in reducing road densities and reducing the effects of sediment production from roads. The miles of roads and trails to be rehabilitated under each action alternative are listed in Table 1.

Table 1. Existing Road and Trail Rehabilitation.

Alternative	Proposed Action	A	B	C	D	E
Miles rehabilitated	48	48	31	48	13	48

There are 181 perennial stream crossings in the Trout Creek drainage and 112 perennial stream crossings in the West Creek drainage. Mitigation has been added to all action alternatives to address issues associated with stream crossings.

No Action (with wildfire)

Direct and Indirect Effects

Under the No Action alternative, the proposed vegetation treatments or road restorations would not happen. Currently, forested habitat types are largely in the 41-70% canopy cover class. As overstory canopy closure has increased, understory vegetation has decreased along with an increase in bare soil. Predicted wildfires would result in a large increase in bare ground, which could result in increased sediment into the streams. The area generally gets 17" precipitation per year, mostly in the summer. While this water comes in the growing season, it often comes in intense thunderstorms and infiltration capacity is exceeded, and runoff increases. This alternative would have one of the highest potentials (along with Alternatives D and E) for affecting fish habitat through increased sedimentation in both Trout and West Creeks.

Streamside vegetation should continue to increase over most of the area, except where limited by recreational use or livestock grazing. Where a wildfire occurs, it is expected that riparian vegetation may be affected, depending on fuels and fire behavior at the time. The loss of streamside vegetation would reduce shading and result in an increase in stream temperatures.

All Action Alternatives

Mitigation Common to All Action Alternatives

There are several mitigation measures to reduce sediment that are included in all alternatives. These include restrictions on temporary road locations, slash disposal, where and when mechanical equipment can operate, and retention of ground cover and slash, etc. For a complete description see the mitigation measures in Chapter 2 of the EIS.

In addition, all alternatives except for Alternative E include a 100' riparian buffer. No harvest activities would occur in this buffer, and existing vegetation would be retained. This would maintain overhead vegetation and stream shading and provide a vegetative filter to trap sediments moving down from upland areas.

Direct and Indirect Effects of Action Alternatives (except Alternative E)

The health of riparian zones and streamside vegetation are the most important factors to reduce stream temperatures, eroding streambanks, and sediment deposition into the stream. These alternatives would include a 100' riparian buffer. No project activities would occur in this buffer, and existing vegetation would be retained. This would maintain overhead vegetation and stream shading and provide a vegetative filter to trap sediments moving down from upland areas.

Proposed Action and Alternatives A, B, and C

These alternatives produce the least amount of sediment.

Alternative D

This alternative produces one of the highest amounts of sediment compared to the other alternatives, based on the high potential for wildfire.

Alternative E

The health of riparian zones and streamside vegetation are the most important factors to reduce stream temperatures, eroding streambanks, and sediment deposition into the stream. This alternative would not include a 100' riparian buffer. Project activities would occur in this buffer, and existing vegetation could be removed. This would decrease overhead vegetation and stream shading and could result in an increase in stream temperatures. Stream temperatures have been identified as a significant factor affecting fish habitat in the analysis area, especially in the lower reaches. Activities in the project areas would result in an increase in stream temperatures at the higher elevations, contributing to bigger problems in the lower stream reaches where it is already an issue.

The lack of a vegetative filter to trap sediments moving down from upland areas could result in an increase in sediment reaching the streams. As a result, this alternative produces the largest amount of sediment relative to the other alternatives.

Summary

All alternatives except Alternative E would maintain stream temperatures. Alternative E would result in an increase in stream temperatures due to loss of streamside vegetation and effects of shading.

Sediment has been identified as an issue in both watersheds, and the alternatives vary in how the address this in each watershed. The maximum annual predicted sediment delivery to both West and Trout Creek during the period 2004-2014, in thousands of tons, for each alternative is shown in Table 2.

Table 2. Maximum Sediment Delivery to Trout and West Creeks, By Alternative.

Maximum Predicted Sediment Delivery By Alternative (in Thousands of Tons)						
NA	PA	A	B	C	D	E
8,200	7,300	5,900	6,700	7,300	8,600	8,800

Cumulative Effects

Other activities contributing towards cumulative effects on stream habitats include development on adjacent private lands, routine county road maintenance, livestock grazing, dispersed recreation, and off-road vehicle use.

Livestock grazing, which also affects streamside vegetation, can affect stream temperatures by loss of vegetative cover and streambank trampling, which widens the stream and reduces overhanging banks. Livestock grazing occurs over about half of the proposed treatment units. Most of it occurs in the Phantom Unit, which also has the largest amount of perennial streams and riparian habitats. Livestock grazing is under increased management and impacts from grazing will continue to decline over the long-term.

The Trout Creek Timber Sale and Polhemus Burn were designed to have little measurable adverse impact on fisheries. The Hayman wildfire outweighs other sediment sources and future wildfires would be expected to have similar impacts. Alternatives that reduce risk of wildfire while protecting riparian areas (i.e., Proposed Action and Alternatives A and C) would reduce the long-term threat to brook trout.

Consistency with Forest Plan

The Proposed Action and Alternatives A thru D are consistent with the Forest Plan direction to protect riparian areas from degradation (through implementation of a riparian buffer) and to focus on habitat features that are limiting (in this case sediment and stream temperatures). Alternative E is not consistent with this direction because it does not maintain riparian buffers, which influence sediment and stream temperatures. A Forest Plan amendment would be needed for implementation of Alternative E. While the action alternatives would increase sediment over the short-term, the risk of wildfires, which can be major sediment producers, would be reduced. As a result, the action alternatives are beneficial over the long-term.

WILDLIFE

Methodology

The effects of the alternatives on wildlife were based in part on expected changes in habitat. Some specific criteria are contained in the Forest Plan for the Pike and San Isabel National Forests (USFS 1994). Where those criteria are applicable, they were used to assess compliance with the Forest Plan. MIS for the Pike National Forest are evaluated in this section of the EIS. Species that are both MIS and sensitive species are addressed in the Biological Evaluation. Threatened, endangered, and sensitive species are addressed in the Biological Evaluation.

The area used for this analysis is based on Diversity Units (DUs). There were originally nine DUs that were used, which cover about 77,680 acres. As a result of the Hayman wildfire, some areas of proposed treatments were dropped and only seven of the nine DUs would actually be affected. However, because of the location and distribution of the DUs, the seven did not make a logical boundary for analysis. The original nine DUs were used because they did make a logical boundary. The DUs involved are DU 918 – 925 and 930. This area is termed the Wildlife Analysis Area (WAA). A map of the DUs is found in the Project file. The WAA is about 60% of the Trout and West Creek watershed analysis area.

Regulations and Policies

The Forest Plan identifies goals for wildlife. These goals include the following:

- Increase diversity for wildlife and habitat improvement.

- Increase winter range habitat capability for deer and elk.

- Protect riparian areas and wetlands from degradation.

The Forest Plan also established general management direction including the following:

- Provide for the habitat needs of MIS in the National Forest.

- Manage and provide habitat for recovery of endangered and threatened species.

- Maintain habitat for viable populations of all existing vertebrate wildlife species.

- Establish elk, bighorn sheep and threatened and endangered species on sites that can supply the habitat needs of the species and the population levels and distribution agreed to with the States.

Additionally, there are standards and guidelines that apply Forest-wide or by Management Area. These criteria are discussed and evaluated where they apply in the analysis.

Analysis of Alternatives

The alternatives have an indirect effect on the degree of risk of wildfire in the WAA. In the short-term, there could be a loss of habitat or displacement as a result of project activities. These negative short-term effects are often outweighed by the positive long-term effects, which include the following: creation, improvement, and enhancement of habitat and reduced risk of wildfire. These effects are discussed by alternative for each of the MIS evaluated.

No Action (with wildfire)

Direct and Indirect Effects

Under this alternative, no vegetation treatments would occur and as a result there are no direct effects. Indirect effects are a result in changes in vegetation and increased risk of wildfire. Conifers in the understory would increase, increasing the canopy closure over time. Understory grasses and shrubs would continue to decline, and the risk of stand-replacing fire would increase.

The assumptions used for this analysis are that 1**)** there are 2- 10,500 acre stand-replacing fires occurring in the 10-year time period in the WAA (the WAA is only about half of the watershed analysis area); 2) the three upper canopy cover classes burned according to their representation in the analysis area; and 3) about half of the acres go to 0-10% canopy cover class (the other half don't burn or underburn, consistent with Hayman). Canopy cover class under No Action is shown in Table 3.

Table 3. Canopy Cover Class, No Action with Wildfire.

Canopy cover class	Acres	Percent*
0-10%	16,800	36%
11-40%	6,937	8%
41-70%	44,280	41%
71-100%	9,265	8%

* These percents are of the forested acres, not the whole WAA

Management Indicator Species

The tool used for determining habitat capability for this EIS is the HABCAP model. This model is designed to reflect wildlife responses to vegetation composition and structure. It uses detailed cover type, vegetation, and topographic information combined with scientifically determined habitat relationships for each species. The model then determines the habitat capability for each species. The area of analysis is Forest Plan DUs.

The Forest Plan includes a Forest-wide Standard and Guideline (S&G) that says that habitat for each MIS on the forest will be maintained at least at 40% or more of potential. This was calculated for the nine DUs that are affected by the six treatment units, using the Rocky Mountain Region Habitat Capability Model. The modeling only incorporates the affect of vegetation treatments. Future wildfires and locations are hard to predict and were not factored in this part of the analysis. Habitat capability for MIS are listed in Table 4, by DU.

Table 4. Habitat Capability for Management Indicator Species, by Diversity Unit.

Diversity Unit	918	919	920	921*	922*	923*	924*	925	930	Ave.
Abert's squirrel - summer	36	41	31	35(10)	54(31)	40(7)	52(16)	34	31	39(26)
Abert's squirrel - winter	36	41	31	35(10)	54(31)	40(7)	52(16)	34	32	39(26)
Elk - summer	18	19	20	15(34)	20(27)	20(24)	18(38)	19	15	18(24)
Elk - winter	18	20	19	15(24)	21(20)	23(13)	20(29)	23	17	20(20)
Mule deer - summer	61	63	68	61(81)	65(72)	68(49)	64(85)	70	62	65(68)
Mule deer - winter	28	34	29	27(22)	49(40)	43(28)	47(44)	38	37	37(33)
Mountain bluebird	44	46	49	50(43)	47(41)	49(41)	53(47)	58	49	49(46)
Red-naped sapsucker	43	45	46	47(23)	47(22)	43(6)	37(18)	42	45	44(32)
Merriams turkey - summer	58	57	53	53(65)	67(73)	64(75)	73(72)	68	53	61(64)
Merriams turkey - winter	29	32	25	27(13)	48(33)	32(11)	45(23)	27	23	32(24)
Beaver	1	0	2	1(1)	0(0)	0(0)	0(0)	2	1	<1
Mallard - summer	13	8	6	2(51)	1(51)	6(81)	19(56)	11	2	31
Mallard - winter	13	6	2	0(0)	1(1)	5(5)	14(14)	9	1	6
Green-tailed towhee	18	20	21	21(26)	20(25)	23(29)	24(30)	24	20	24
Wilson's warbler	13	7	7	3(7)	5(9)	10(15)	20(26)	14	6	11

* Habitat capability post-Hayman for the four affected Diversity Units is in ( ).

This table shows that pre-Hayman many of the DUs were meeting the 40% habitat potential. Species that are associated with non-forested habitats came out low, partly because the model doesn't address these habitats well (beaver and mallard), or there is very little suitable habitat present (green-tailed towhee, and Wilson's warbler). As discussed in the Existing Condition report, beaver appear to be occupying most of the suitable habitat. Mallards are widespread and adapt to many different habitats, and habitat suitability is expected to meet Forest Plan goals. Towhee's, which are one of the most abundant birds in Colorado, are only limited by the amount of habitat in the project area. More suitable habitat is found at lower elevations, where shrub understories are more developed, and where pinyon-juniper is present. Wilson's warblers are associated with higher-elevation riparian areas and nest in willow and alder. Effects on these species will not be analyzed further.

The table shows that after the Hayman wildfire about half of the Habitat Capability Indices (HCIs) were still near or above the 40% minimum in the Forest Plan. The model suggests that after the wildfire there were increases in elk and mule deer summer habitat, increases in peregrine falcon foraging habitat, and summer turkey habitat. It also suggests that as a result of the wildfire there is a decrease in suitability for mule deer winter habitat, Abert's squirrel, mountain bluebird, red-naped sapsucker, and turkey winter habitat. Lewis' woodpecker and three-toed woodpecker, which are also sensitive species and are discussed in the Biological Evaluaion, also show a decrease in habitat suitability. Effects of No Action on MIS are summarized in Table 5.

Table 5. Effects of No Action.

MIS	Effects of No Action
Abert's squirrel	The area may have been providing more habitat than what occurred during pre-settlement times, due to fire exclusion (USFS 2001). Before the Hayman wildfire, the HCI was close to 40% for both the summer and winter. However, after the wildfire that burned as a stand-replacing fire over about 45% of the area, the HCI dropped to 26%. Without any vegetation treatments in the unburned areas, stand density will continue to increase over time. This may result in an eventual decline due to increases in insects or disease. In addition, as trees become denser, cone production on individual trees may decrease. Without any treatments in the unburned areas, habitat capability would decrease slowly over time. When another stand-replacing fire does occur, it is expected that there would be patches of forested stands that would survive, but total amount of habitat, and connectivity between patches would greatly decrease and habitat capability would drop to very low levels for the next several decades.
Elk	While the model shows that the area was not meeting the 40% habitat capability, discussions with CDOW biologists indicate that over the larger area (11-Mile Elk Herd), population objectives are being met. After the Hayman wildfire, summer HCI increased to around 40%, while there was no change in winter HCI. Without any vegetation treatments in the unburned areas, stand density will continue to increase over time, decreasing understory (forage) production. Further wildfires will increase the summer habitat capability. Under No Action, no existing non-system roads would be rehabilitated. It is expected that high road densities would continue to cause disturbance and possible displacement onto adjacent lands.
Mule deer	The model suggests that while overall habitat capability was being met before the Hayman wildfire, currently it is being met for mule deer in the summer, but not in winter. State herd objectives are being met. Without any vegetation treatments in the unburned areas, stand density will continue to increase over time, decreasing understory production. Habitat capability will decline over time. However, wildfire will have the effect of increasing forbs and shrubs in the understory would increase somewhat.
Mountain bluebird	According to the HABCP model, all the Diversity Units are currently above the Forest Plan standards and guidelines under existing conditions (after Hayman wildfire). Without any treatments stands would become more closed and suitability for this species would decrease, as they need open stands and open areas for foraging.

MIS	Effects of No Action
Red-naped sapsucker	According to the HABCAP model, all Diversity Units that were not affected by Hayman wildfire are currently above the Forest Plan S&G. Without any treatments in the unburned areas, stand density will continue to increase. When another stand-replacing fire does occur, it is expected that there would be patches of forested stands that would survive, but total amount of habitat and habitat capability would drop to very low levels for the next several decades. However, because this species is often associated with aspen, habitat suitability would increase over the long-term as aspen is regenerated by wildfire.
Merriams turkey	According to the HABCAP model, all diversity units are currently above the Forest Plan S&G for summer habitat. Winter habitat is below 40%. This is because they shift use into older stands and make less use of younger stands thru the winter. Because this species needs open stands and trees with an open canopy for roosting, habitat capability would decrease over the long-term without any treatments. Stand-replacing wildfire, such as Hayman, reduce availability of winter roosting habitat.

Thermal cover. Thermal cover is cover used by animals to moderate effects of weather (Hoover and Wills 1987). Thermal relief may be supplied by vegetation, topography, other animals, and different combinations of vegetation, water, and air movement (Lyon and Christensen 1992).

Structurally, thermal cover is defined for elk as a stand of coniferous trees 40 feet tall or taller with average crown closure of 70% or more. The Pike Forest Plan Standards and Guidelines include thermal cover for winter and spring-summer. Because the Forest Plan direction applies to thermal cover year-round, it was calculated both with and without aspen. Aspen would provide thermal cover in the summer but not in the winter. Thermal cover was calculated by DU, using the assumption that 3c, 4c and a portion of 5 (pole, sawtimber and mature, >70% canopy cover) would provide thermal cover (Table 6).

Table 6. Thermal Cover Distribution by Diversity Unit (Post Hayman wildfire).

Diversity Unit	918	919	920	921	922	923	924	925	930
Thermal Cover Summer	28%	20%	14%	9%(9%)	12%(4%)	23%(0)	8%(0)	6%	8%
Thermal Cover Winter	27%	20%	13%	8%(8%)	6% (4%)	23%(0)	8%(0)	3%	7%

This shows that based on available information, three of the DUs were meeting the Forest Plan guidance for thermal cover (20% of forested DUs) before the Hayman wildfire. After Hayman, only two are meeting the 20% level. As discussed in Chapter 3 of the EIS, winter thermal cover may not be as critical in this area. Winters are mild, snow cover is light, and winter surveys generally find most of the elk at higher elevations on open flats. In addition, this area is part of the 11-mile Elk Herd, which is well above state population objectives. This objective was developed from research in the Blue Mountains of Oregon and Washington (Thomas 1979). This research acknowledges that "where ponderosa pine stands were used for thermal cover, it is especially rare to find canopy closures approaching 70%."

It would appear, based on elk populations, that thermal cover is not limiting numbers even though several of the DUs are below Forest Plan standards and guidelines.

Landbirds. Strategies for conservation of landbirds include 1) maintenance of natural vegetation patterns and 2) maintenance of specific habitat components required by sensitive species. Studies have found that pygmy nuthatches and violet-green swallows indicate the overall health of bird communities in ponderosa pine forests (Szaro and Balda 1982). Because only the pygmy nuthatch is covered in Hoover and Wills (1987), only the pygmy nuthatch will be used for analysis and will be used to represent the health of bird communities. This species is also a sensitive species and is addressed in the Biological Evaluation.

Mitigation Measures Common to All Action Alternatives

There are numerous mitigation measures that apply to wildlife or wildlife habitat. These include silvicultural prescriptions, retention of a riparian buffer, snag and downed woody debris guidelines, measures for goshawks, flammulated owls, Abert's squirrel, Merriams turkey, big game calving/fawning, and thermal cover. (Riparian buffers and thermal cover retention mitigation would not apply to Alternative E.) See Chapter 2 of the EIS for a complete list of all mitigation measures.

Features Common to Action Alternatives

Management Prescription 04B (emphasis on habitat for MIS) has been dropped from treatment in most of the alternatives. This area was probably put into this prescription because of elk or aspen-associated species. This area was dropped from the proposal because of the stringers of thermal cover that made the treatments more difficult to implement. Because thermal cover patches would be treated under Alternative E, this area is proposed for treatment in that alternative. Treatments in this unit would improve foraging habitat for elk and would also improve aspen habitats for associated species over the long-term as aspen is regenerated following treatments.

Management Prescription 02B, Rural and Roaded Natural Recreation, is found on the western part of Phantom, the eastern 2/3 of Ryan Quinlan, the south half of Long John and all of the Skelton Treatment Unit. The Forest Plan includes direction to maintain habitat capability for MIS at 60%. As shown in Table 6 above, when measured by DU, only mule deer and Merriams turkey summer habitat are currently meeting the 60%. This same trend is probably true when measured by Management Prescription area as well. All of the proposed alternatives move the vegetation towards historic conditions to varying degrees, and reduce the risk of damaging crown fires that have the greatest affect of habitat suitability for MIS.

The alternatives have an array of effects on stand densities across the WAA. While many of the species using these forest types are associated with more open stands, there have always been areas with denser canopy covers. Thinning of the existing stands is not expected to create barriers to movement or cause fragmentation of habitat. Existing dense patches (>70% canopy cover) would not be treated under any alternative except E.

Mistletoe would decrease under all action alternatives. It would not be removed from the landscape, but would be found at levels more closely resembling the historic conditions.

Mitigation is included in all action alternatives for soft and hard snag retention. In addition, trees and/or snags with existing cavities and lightening-struck trees would be retained in all alternatives. These would maintain habitat over the short-term, and trees that are retained would eventually provide habitat over the long-term.

The Forest Plan includes direction to maintain 10 percent of each DU in old growth forest. Based on pre-Hayman conditions, structural stage 5 habitats are very limited in the WAA, as shown in the Table 7 (site-specific effects of Hayman fire on this structural class are not known). The fire affected a large part of DU 921 and all of 922, both of which had some acreage of Structural stage 5.

Table 7. Percent of Diversity Unit in Structural Stage 5 Habitat Class.

Diversity Unit	918	919	920	921	922	923	924	925	930
% structural stage 5	0	3	3	11	4	0	0	0	0

As discussed in the vegetation section, much of the project area was logged in the late 19th and early 20th centuries; thus, older stands are rare in the project area. No old growth was located during field reconnaissance for this project. The fuels reduction prescription is intended to maintain existing old growth and enhance future old growth. Old growth habitat components such as large trees, snags, and variety in density from open to sparse would be maintained in all action alternatives. Thinned stands would be managed to sustain late-successional habitats across the project area and reduce the risk of loss from wildfire.

The WAA provides habitat for numerous species of birds. Because pygmy nuthatches were found to be good indicators of overall "health" of ponderosa pine commuities (Szaro and Balda 1982) they were used to analyze effects for forest-associated bird species. This species is a Sensitive species and analysis is found in the Biological Evaluation.

Given that habitat capability is below Forest Plan direction for some species, the project has been designed to at least maintain current capability, and where possible, increase capability. In general, all alternatives except E are designed to meet current Forest Plan direction thru design features and mitigation measures.

General Effects By Management Activity

Following is a description of general effects to wildlife habitat or species from project activities. Although the amount and distribution of these activities may differ by alternative, the general types of effects from the activities would be the same for all Alternatives.

Mechanical vegetation treatment

Activities associated with mechanical treatments include access for workers, dust abatement, skidding/yarding/loading/hauling, landings and skid trails, logging systems (ground-based, helicopter, cable), slash disposal, refueling and rehab of units, roads, and skid trails.

Timber harvest activities alter vegetation components that comprise habitat for associated wildlife species. Stand condition includes the presence of disease or insects, number of dead or dying trees, stand structure (canopy layers), stand size (tree height and diameter), and species composition. Stand conditions can be greatly influenced by regeneration technique, treatment of shrubs and grasses, selection of tree species to be harvested, extent or intensity of thinning, and silvicultural system used (Hall and Thomas 1979). Various forest stages or structures can be created and maintained through different harvest techniques.

The mechanical processes involved in timber harvest produce disturbance to some species of wildlife because of equipment use/noise or human presence. Snags are often removed adjacent to roads for safety reasons, and roads provide ease of access for people wanting firewood. This reduces the habitat for species that require snags/downed logs. The timing of project activities (season) can also have different effects.

The assumptions used for this analysis are that helicopter versus ground-based logging would take about the same length of time, on a stand-by-stand basis. However, where there are several helicopter units, activities can occur much faster and the total project could take less time. Helicopter log removal would occur during the summer, but ground based (yarding or skidding) would occur when soils are frozen (winter) or when soils are dry. Mitigation measures include mitigation for calving and fawning and around goshawk nests; these would apply to both types.

In the Central Rockies ponderosa pine type, grasses and a sub-shrub make up 95% of the herbage composition by weight (Arizona fescue, mountain muhly, blue grama, sun sedge, little bluestem and fringed sagebrush). Wright (1978) reviewed studies of effects of thinning on understories. He found that in the central and Southern Rockies, the understory would yield 250-400 lb/acres if thinned to a 45- to 60 ft basal area/acre (in Wright 1978). Kaufmann et al. (2001) studied vegetation around Cheesman Lake. They found that coarse-textured granitic soils and low precipitation result in low overstory and understory production in their study area. More open stand conditions would favor better, though patchy, understory production. The results of these and other studies on affects of thinning have been incorporated into the HABCAP model and as a result elk and mule deer summer habitat show an increase as a result of thinning.

Prescribed Fire

Activities associated with prescribed fire include fireline construction (machine-built, foam lines, natural barriers, hand-built fireline, "black'line, etc.), ignition (hand, mechanized, aerial), and mop-up (engine, hand tools, hose lays).

Fires change vegetation composition, density, size, amount and distribution, as well as successional trends. An analysis of fire history for the Cheesman Reservoir area to the north of the project area found that (1) fire sizes ranged from the scale of individual trees or small groups of trees to the entire landscape; (2) intervals between fire years ranged from 1 to 29 years across the landscape, with 3-58 years at one stand, to more than 100 years at other locations; (3) fire severity varied, with both surface fires and widespread stand-destroying fires; and (4) season of fire occurrence varied (Brown et al. 1999). Vegetation and associated wildlife species have evolved with fire as a common occurrence.

Long-term fire exclusion has changed vegetation structure and density from pre-settlement conditions. These changes have favored some species, while others have seen decreases in suitable habitat. Fire exclusion has also resulted in more fuels, so that when wildfires do burn they are more likely to burn as high-severity fires.

The major impacts of prescribed fire on wildlife focus on changes in vegetation (McMahon and deCalesta 1989). Direct effects are limited to mortality, and in terms of numbers of animals in the population, are usually insignificant. Small mammals are the most affected, and the degree of effects is related to the uniformity, severity, size, and duration of the burn. Indirect effects are related to changes in vegetation structure, composition, bare soil, and potential for spread of invasive plant species, presence of downed woody debris, and effects on forage and cover.

Fire may cause short-term increases in food for some species. The extent of fire effects on animal communities generally depends on the extent of change in habitat structure and species composition caused by fire. Stand-replacing fires usually cause greater changes than non-lethal underburns. Animal species are adapted to survive the pattern of fire frequency, season, size, severity, and uniformity that characterized their habitats in pre-settlement times (Smith 2000).

Alternatives vary in the trade-offs of vegetation changes as a result of fire suppression or prescribed fire. Potential effects to wildlife habitat and species from fire management will vary by alternative.

Assumptions used for this analysis are that jackpot or pile burning could occur from mid-October thru March, while broadcast burning could occur from March to April or September to October. One soil mitigation measure is to leave the slash on the ground at least one year before burning; this would have the result of spreading the disturbance over another year, whereas mechanical treatment would occur immediately following tree removal.

Road and Trail Construction and Use

New road construction and reconstruction can include clearing of vegetation, installation of drainage features, construction using cuts and fills, and surfacing. Decommissioning may include re-contouring, water-barring, ripping of the roadbed, and fill pullback.

Roads and trails remove vegetation from the travel surface. This directly reduces the amount of habitat available and indirectly affects adjacent habitat. The effects of roads and motorized and non-motorized trails on wildlife depend on the species, topography, vegetation type, season, frequency, and predictability of human use. Effects range from increased vulnerability from loss of snags and downed logs, disruption of movement patterns, fragmentation of habitat, and displacement/avoidance responses (Wisdom et al. 2000). Access on roads and trails can be restricted to certain times of the year to reduce or eliminate the effects of access.

Open motorized road and open motorized route densities for the existing condition are displayed in Chapter 3 of the EIS. Because elk and mule deer are the only species discussed in this analysis that may be directly affected by road densities, and populations are above state objectives for both species, it is assumed that the current road system isn't negatively impacting them. All action alternatives would have a short term increase in road densities, but would have a long term decrease as existing unclassified roads are restored.

None of the areas that are accessed by temporary roads or road planned for restoration are known to have unique biological characteristics.

Generally roads provide access for firewood cutters. Temporary roads may improve access but the increased potential for loss of snags to firewood cutters is not expected to be an issue. All alternatives include mitigation to maintain snag and cavity nester habitat during project activities. In addition, all alternatives have some level of rehabilitation of existing roads. Newly created snags will not be accessible to firewood cutters once the roads are rehabilitated.

There is one paved, two-lane highway bisecting the project area. Generally, high-speed, four-lane highways with heavy traffic have been identified as having the most impact on wildlife (Gunther et al. 1998; Clevenger 1998). There is no information to suggest that current levels of traffic on Highway 67 are impacting wildlife populations.

Alternatives A, C and E and the Proposed Action would have the most impact on reducing road densities and reducing the effects of roads and access on most wildlife species, as shown in Table 1, above. Table 8 shows open road densities before, during, and after project activities associated with each action alternative.

Table 8. Open Road Densities Before, During and After Project Activities.

Timeframe	Proposed Action and Alt's A, C and E	Alt B	Alt D
Existing condition	3.9 mi/mi2	3.9 mi/mi2	3.9 mi/mi2
With temporary roads	4.0 mi/mi2	4.0 mi/mi2	3.9 mi/mi2
After road rehabilitation	3.7 mi/mi2	3.8 mi/mi2	3.8 mi/mi2

Non-Native Plants

Over time, many non-native plants have become established on the Forest. This may affect wildlife habitat in several ways. First, as native plant species are replaced, this may affect foraging habitat, nesting habitat, and cover. When noxious weeds have replaced native species, they may affect the functioning of riparian and upland habitats, influencing those wildlife species using these areas. In addition, they may alter the natural processes (i.e., fire, water infiltration) of the plant community, affecting ways that wildlife would use it. A comparison of the alternatives and their potential to spread noxious weeds is found in the noxious weed section of the EIS.

Proposed Action

Under this alternative, forested stands in the WAA would move towards more open stands. Table 9 shows the canopy cover class distribution of forested stands following treatments.

Table 9. Canopy Cover Classes, Proposed Action.

Canopy cover class	Acres	Percent
0-10%	17,242	22%
11-40%	25,339	33%
41-70%	21,637	28%
71-100%	8,174	11%

After treatment, there is still a risk of wildfire. If wildfires burned after treatments as described in this EIS, the anticipated results would be as shown in Table 10.

Table 10. Canopy Cover Classes, Proposed Action with Wildfire.

Canopy cover class	Acres	Percent
0-10%	19,867	26%
11-40%	24,131	31%
41-70%	20,613	26%
71-100%	7,386	10%

Under this alternative, trees infected with dwarf mistletoe would be heavily thinned. It would still be a component of the landscape, but more close to historic levels. With a more open, single-layered forest condition after treatments, mistletoe spread would be slowed.

Management Indicator Species

The HABCAP model was run to compare changes from the existing condition (Table 11). The + indicates an increase in habitat capability, while a – indicates a decrease in habitat capability and an = indicates no change.

Table 11. Habitat Capability for MIS under the Proposed Action.

Diversity Unit	918	919	920	921	922*	923*	924*	925	930	Ave.
Abert's squirrel - summer	31/-	33/-	17/-	9/-	31	7	16	26/-	30/-	22
Abert's squirrel - winter	31/-	33/-	17/-	9/-	31	7	16	26/-	30/-	22
Elk - summer	18/=	21/+	27/+	36/+	27	24	38	21/+	16/+	25
Elk - winter	21/+	24/+	28/+	25/+	20	13	29	27/+	17/=	23
Mule deer - summer	65/+	71/+	87/+	84/+	72	49	85	76/+	65/+	73
Mule deer - winter	32/+	39/+	37/+	23/+	40	28	44	42/+	36/-	36
Mountain bluebird	51/+	59/+	80/+	48/+	41	41	47	70/+	53/+	54
Red-naped sapsucker	41/-	41/-	35/-	22/-	22	6	18	38/-	45/=	30
Merriams turkey - summer	65/+	70/+	77/+	69/+	73	75	72	75/+	56/+	70
Merriams turkey - winter	53/-	25/-	14/-	12/-	33	11	23	20/-	22/-	24

* no change in these DUs because treatments dropped after Hayman wildfire

Table 12 summarizes the effects of the Proposed Action on MIS.

Table 12. Effects of the Proposed Action.

Species	Effects of the proposed action
Abert's squirrel	The model shows a decline in habitat capability for this species. However, it does not incorporate the effects of mitigation. Mitigation associated with this alterative calls for identification and protection of nest and feed trees during project layout. Since feed trees are chemically distinct than most other trees, it is important to retain trees that are being used rather than just a number of trees. It has also been suggested that thinning may enhance cone production in ponderosa pine, which could result in higher squirrel numbers during years of high cone production (USFS 2001). In addition, there is mitigation to retain trees in patches, rather than evenly spaced. This patchiness, in addition to the retention of thermal cover and stands on extended steeper slopes, will benefit this species. It is expected that habitat suitability and populations will be maintained at the current levels (post-Hayman) under the Proposed Action. Hayman wildfire had a much greater affect on habitat capability over the WAA (a 13% decrease) than do the proposed treatments (4% decrease). In addition, the wildfire is expected to have taken out nesting/feeding clumps, while mitigation for this project will retain these features. The proposed treatments greatly reduce the potential for future damaging crown fires and would benefit this species. Mistletoe has been identified as providing feeding and nesting habitat for this species. While some mistletoe-infected trees would be removed, it would still be retained at near historic levels in the treated areas and would continue to provide habitat for this species.

Species	Effects of the proposed action
Elk	The proposed treatments would improve summer and winter habitat for elk. With a decrease in overstory, understory grasses and shrubs would increase, providing more forage. Mitigation limits activities in calving areas. This alternative also includes the construction of about 14 miles of temporary road, and around 48 miles of existing roads or trails that would be used and rehabilitated following the treatments. There would be a short-term increase in disturbance, but overall would benefit elk by decreasing disturbance and displacement due to lower road densities. While the changes in open road densities in open road density are small, some areas may provide security and help hold elk on public lands in the project area. Thermal cover stands are not treated, but could be affected by wildfire. Winter thermal cover acres would be expected to be low but summer thermal cover would increase as aspen regenerates in treated areas and areas burned by wildfire. Habitat suitability and populations for elk are expected to increase under this alternative.
Mule deer	The proposed treatments would improve summer and winter habitat for mule deer. With a decrease in overstory, understory forbs and shrubs would increase, providing more browse. Mitigation limits activities in fawning areas. Habitat suitability for mule deer would increase under this alternative and populations should increase as well.
Mountain bluebird	Nest site availability is a limiting factor in mountain bluebird productivity. Mitigation measures include a measure that retains all trees and/or snags with existing cavities, all lightening-struck trees, as well as a specified number of snags per acre; and thus will maintain nesting habitat in treated areas. Mistletoe would still be present in the stand and would provide foraging habitat. Mountain bluebirds are also associated with open woodland, edge habitats, and early post-fire conditions, and as a result, this alternative will improve foraging habitat for this species. Habitat suitability would be over the 40% minimum level and numbers would be expected to increase under this alternative.
Red-naped sapsucker	The HABCAP model suggests a slight decrease in habitat capability for this species as a result of the proposed treatments. However, Hayman had a much greater affect on habitat capability (12% decrease) and treatments would reduce the potential for further damaging crown fires. Because this species uses live trees in coniferous/deciduous forests that include aspen and cottonwood, all action alternatives should benefit this species because of expected aspen regeneration. In addition, project design and mitigation retain the older, mature trees that are most suitable for this species.
Merriams turkey	The model suggests an increase in summer habitat and a decrease in winter habitat for this species. Summer habitat is expected to improve because of the preference for small openings with increased ground vegetation. The decrease in winter habitat displayed in the HABCAP model is mitigated through the retention of thermal cover patches, known turkey roost sites, and retention of trees on extended slopes over 20%. In Colorado, wild turkeys are on the nest with eggs in late May (Kingery 1998). Since broadcast burning would occur between March to April or September to October, burning would not result in a loss to nests. Thinning activities occurring during May through June could result in loss of eggs or nestlings.

Thermal cover. Mitigation for this alternative includes the retention of all existing thermal cover. In addition, there may be an increase in summer thermal cover over the long-term as aspen increases in treated areas and areas burned by wildfire. As discussed in the Existing Condition report, winter thermal cover may not be as critical in this area. Winters are mild, snow cover is light, and winter surveys generally find most of the elk at higher elevations on open flats. In addition, this area is part of the 11-mile Elk Herd, which is well above state population objectives. It would appear, based on elk populations, that thermal cover is not limiting numbers even though most of the DUs are below Forest Plan standards and guidelines.

The proposed treatments would result in a decrease in the potential for damaging crown fires and additional loss of existing thermal cover. In addition, only about 2/3 of the six treatment units will be treated, and residual unthinned stands will move into thermal cover over time.

Alternative A.

The long-term effects of this alternative would be similar to the effects of the Proposed Action. Vegetation outcomes are the same, except different methods are used to achieve them. This alternative uses mechanical methods to reduce understory fuels instead of broadcast burning as proposed in the Proposed Action.

The difference in this is that mechanical methods could occur at any time during the year when soil is frozen or dry (unless in a calving or fawning area or area with another seasonal restriction), while broadcast burning could occur from March to April or September to October.

Direct and Indirect Effects

Effects of Alternative A on MIS are summarized in Table 13.

Table 13. Effects of Alternative A.

Species	Effects of Alternative A
Abert's squirrel	Same as Proposed Action.
Elk	Mitigation limits activities in calving areas and there should be no differences in effects from the Proposed Action.
Mule deer	Mitigation limits activities in fawning areas and there should be no differences in effects from the Proposed Action.
Mountain bluebird	Because mechanical treatments are more controlled, the potential for loss of designated snags and loss of trees with existing cavities and other marked trees, is very low. Habitat and populations are expected to increase above current levels.
Red-naped sapsucker	Because mechanical treatments are more controlled than broadcast burning, the potential for loss of trees with existing cavities (mitigation) is very low. Effects similar to Proposed Action.
Merriam's turkey	Because mechanical treatments are more controlled than broadcast burning, the potential for loss of designated turkey roosts (mitigation) is very low. Displacement could occur at any time when soils are dry or frozen enough for project activities to occur. In Colorado, wild turkeys are on the nest with eggs in late May (Kingery 1998). Thinning activities occurring during May thru June could result in loss of eggs or nestlings. Effects similar to Proposed Action.

Alternative B.

Under this alternative, forested stands in the WAA would move more slowly towards more open stands. Table 14 shows the canopy cover class distribution of forested stands following treatments.

Table 14. Canopy Cover Classes, Alternative B, Following Treatments.

Canopy cover class	Acres	Percent
0-10%	17,242	22%
11-40%	19,809	25%
41-70%	27,167	35%
71-100%	8,174	11%

Since this alternative would treat fewer acres, the risk of wildfire is higher than the Proposed Action. Assuming wildfire happened as outlined in this EIS, canopy cover classes would be as shown in Table 15.

Table 15. Canopy Cover Classes, Alternative B, Following Treatments and Wildfire.

Canopy cover class	Acres	Percent
0-10%	22,492	29%
11-40%	17,919	23%
41-70%	24,542	31%
71-100%	7,439	10%

Direct and Indirect Effects

Effects of Alternative B on MIS are summarized in Table 16.

Table 16. Effects of Alternative B.

Species	Effects of Alternative B
Abert's squirrel	Mitigation associated with this alterative would protect nest and feed trees during project layout. Since feed trees are chemically different than most other trees, it is important to retain trees that are being used rather than just a number of trees. It has also been suggested that thinning may enhance cone production in ponderosa pine, which could result in higher squirrel numbers during years of high cone production (USFS 2001). Mistletoe would still be maintained as a component across the area. Where it is associated with nest and feed trees, it would continue to provide a habitat component for this species. Because this alternative treats fewer acres, the risk of damaging crown fire is higher than the Proposed Action. It is expected that habitat suitability and populations will decrease, as it is predicted that twice as many acres would burn under wildfire under this alternative.
Elk	The proposed treatments would improve summer and winter habitat for elk. With a decrease in overstory, understory grasses and shrubs would increase, providing more forage. Mitigation limits activities in calving areas. This alternative also includes the construction of about 13 miles of temporary road and the rehabilitation of 31 miles of existing roads or trails. There would be a short-term increase in disturbance, but overall would benefit elk by decreasing disturbance and displacement due to lower road densities. Habitat suitability and populations for elk are expected to increase under this alternative, although not as much as under the Proposed Action. Thermal cover stands are not treated, but could be affected by wildfire. Thermal cover acres would be expected to be very low but summer thermal cover would increase as aspen regenerates in treated areas and areas burned by wildfire.
Mule deer	The proposed treatments would improve summer and winter habitat for mule deer. With a decrease in overstory, understory forbs and shrubs would increase, providing more browse. Mitigation limits activities in fawning areas. Habitat suitability for mule deer would increase under this alternative, and populations should increase as well, although not as much as the Proposed Action.
Mountain bluebird	Nest site availability is a limiting factor in mountain bluebird productivity. Mitigation measures include a measure that retains all trees and/or snags with existing cavities, all lightening-struck trees, as well as a specified number of snags per acre; and thus will maintain nesting habitat. They are also associated with open woodland, edge habitats and early post-fire conditions, and as a result, this alternative will improve foraging habitat for this species. However, because of the higher probability of damaging crown fires, nest site availability could decrease. Mistletoe would still be present in the area and provide foraging habitat, although at lower levels than the Proposed Action.

Species	Effects of Alternative B
Red-naped sapsucker	The HABCAP model would suggest a slight decrease in habitat capability for this species. Because this species uses live trees in coniferous/deciduous forests that include aspen and cottonwood, all action alternatives should benefit this species. In addition, project design and mitigation retain the older, mature trees that are most suitable for this species. As ponderosa pine and Douglas-fir are thinned, aspen is expected to increase in the understory. Because fewer acres are treated, the potential for damaging crown fires is higher than the Proposed Action. Habitat would decrease over the short-term, but would increase as aspen regenerates in burned areas.
Merriam's turkey	The model suggests an increase in summer habitat and a decrease in winter habitat for this species. Summer habitat is expected to improve because of the preference for small openings with increased ground vegetation. The decrease in winter habitat displayed in the HABCAP model is mitigated through the retention of thermal cover patches, known turkey roost sites, and retention of trees on extended slopes over 20%. Because fewer acres are treated, the potential for damaging crown fires is higher than the Proposed Action. Roost sites could decrease over the area, reducing habitat capability (but still above the 40% level). In Colorado, wild turkeys are on the nest with eggs in late May (Kingery 1998). Since broadcast burning would occur from March to April or September to October, burning would not result in a loss to nests. Thinning activities occurring during May thru June could result in loss of eggs or nestlings.

Alternative C.

Alternative C is very similar to the Proposed Action, since it includes the same thinning and burning prescription. Alternative C eliminates any impact on MIS species from new temporary roads; however, these impacts are minimal due to the low impact design and temporary nature of the roads. Alternative C includes more helicopter yarding, which may increase short-term disturbance for some MIS species, but would also reduce the duration of the disturbance.

Alternative D.

Under this alternative, forested stands in the WAA would move only minimally towards more open stands. Table 17 shows the canopy cover class distribution of forested stands following treatments.

Table 17. Canopy Cover Classes, Alternative D After Treatment.

Canopy cover class	Acres	Percent
0-10%	17,242	22%
11-40%	13,489	17%
41-70%	33,487	43%
71-100%	8,174	11%

Since this alternative would treat fewer acres, the risk of wildfire is higher than the Proposed Action. Assuming wildfire happened as outlined in this EIS, canopy cover classes would be as shown in Table 18.

Table 18. Canopy Cover Classes, Alternative D, Following Treatments and Wildfire.

Canopy cover class	Acres	Percent
0-10%	26,692	34%
11-40%	11,221	14%
41-70%	27,722	36%
71-100%	6,756	9%

Direct and Indirect Effects

Because this alternative treats only 7,000 acres out of the 77,000-acre WAA, there would be a change over only 9% of the area. This change would be a decrease in the 41-70% canopy cover class and an increase in the 11-40% canopy cover class. Effects would be very similar to Alternative B, except that the 0-10 and 11-40 canopy cover class representation is reversed. This is because more acres would burn as damaging crown fire under this alternative, as fewer acres are treated.

Effects for all MIS would be similar as those described for Alternative B.

Alternative E.

This alternative is the most aggressive at moving towards more open stands. Table 19 shows the canopy cover class distribution of forested stands following treatments. It proposes treatment over 42% of the WAA.

Table 19. Canopy Cover Classes, Alternative E.

Canopy cover class	Acres	Percent
0-10%	25,142	32%
11-40%	25,759	33%
41-70%	17,791	23%
71-100%	3,700	5%

There is still a risk of wildfire, even though treatments are heavier in this alternative. Under the wildfire scenario for this alternative, forested canopy cover would be distributed as shown in Table 20.

Table 20. Canopy Cover Classes, Alternative E and Wildfire.

Canopy cover class	Acres	Percent
0-10%	27,767	37%
11-40%	22,871	29%
41-70%	16,793	22%
71-100%	3,490	5%

Direct and Indirect Effects

Table 21 summarizes the effects of Alternative E on MIS.

Table 21. Effects of Alternative E

Species	Effects of Alternative E
Abert's squirrel	Based on criteria in the HABCAP model, implementation of this alternative would drop the habitat capability below the 22% of the Proposed Action. While this alternative does include mitigation to retain existing nesting and foraging trees, much of the project will be more open between the nesting and foraging clumps. Without the patchiness provided by retention of thermal cover patches, stands will be more open. This may increase seed production, but may decrease suitability and increase vulnerability to predators. Mistletoe will be reduced most over the WAA under this alternative, affecting nesting cover and foraging habitat. Persistent openings proposed in this alternative would not be suitable for this species and habitat would be lost in these openings over the long-term.
Elk	The proposed treatments would improve summer and winter habitat for elk. With a decrease in overstory, understory grasses and shrubs would increase, providing more forage. Mitigation limits activities in calving areas. This alternative also includes the construction of about 14 miles of temporary road and rehabilitation of 48 miles of existing roads or trails. There would be a short-term increase in disturbance, but overall this alternative would benefit elk by decreasing disturbance and displacement due to lower road densities. Habitat suitability and populations for elk are expected to increase under this alternative. This alternative does not include mitigation to retain thermal cover. There may be an increase in summer thermal cover the long-term as aspen increases. Field reviews have found that about 15,300 acres have the potential for aspen regeneration, or 42% of the treated areas. As discussed in Existing Condition, winter thermal cover may not be as critical in this area. Winters are mild, snow cover is light, and winter surveys generally find most of the elk at higher elevations on open flats. In addition, this area is part of the 11-mile Elk Herd, which is well above state population objectives. It would appear, based on elk populations, that thermal cover is not limiting numbers even though most of the Diversity Units are below Forest Plan standards and guidelines.
Mule deer	The proposed treatments would improve summer and winter habitat for mule deer. With a decrease in overstory, understory forbs and shrubs would increase, providing more browse. Mitigation limits activities in fawning areas. Habitat suitability for mule deer would increase under this alternative, and populations should increase as well.

Species	Effects of Alternative E
Mountain bluebird	Nest site availability is a limiting factor in mountain bluebird productivity. Mitigation measures include a measure that retains all trees and/or snags with existing cavities, all lightening-struck trees, as well as a specified number of snags per acre; and thus will maintain existing nesting habitat. Mountain bluebirds are also associated with open woodland, edge habitats and early post-fire conditions, and as a result, this alternative will improve foraging habitat for this species. Numbers would be expected to increase over the short-term under this alternative. Mistletoe would decrease over current conditions, but would be present at near historical levels. This habitat component would continue to provide foraging habitat for this species. Persistent openings would provide foraging habitat, but nesting habitat would be lost over the long-term. Existing nesting habitat features would be retained, as well as replacement trees in the future. The risk of wildfire is low under this alternative and numbers of bluebirds would be expected to remain at about current levels under this alternative over the long-term.
Red-naped sapsucker	The HABCAP model would suggest a decrease in habitat capability for this species over the short-term. Because this species uses live trees in coniferous/deciduous forests that include aspen and cottonwood, all action alternatives should benefit this species. In addition, project design and mitigation retain the older, mature trees that are most suitable for this species. As ponderosa pine and Douglas-fir are thinned, aspen is expected to increase in the understory. Persistent openings would convert to grassy openings at low elevations and south exposures, and have increasing aspen on northerly aspects and higher elevations. Increased aspen would benefit over the long-term, but habitat would be lost over the long-term in the grassy openings.
Merriam's turkey	The model suggests an increase in summer habitat and a decrease in winter habitat for this species. Summer habitat is expected to improve because of the preference for small openings with increased ground vegetation. The decrease in winter habitat displayed in the HABCAP model would be partially mitigated thru the retention of known turkey roost sites. In Colorado, wild turkeys are on the nest with eggs in late May (Kingery 1998). Since broadcast burning would occur from March to April or September to October, burning would not result in a loss to nests. Thinning activities occurring during May thru June could result in loss of eggs or nestlings.

Thermal cover. Thermal cover is a particular issue because there is Forest Plan direction related to thermal cover, and much of the area is naturally and currently below this direction. Thermal cover is used by animals to moderate effects of weather (Hoover and Wills 1987). Thermal relief may be supplied by vegetation, topography, other animals, and different combinations of vegetation, water, and air movement (Lyon and Christensen 1992). Structurally, thermal cover is defined for elk as a stand of coniferous trees 40 feet or taller with average crown closure of 70% or more. Because the Forest Plan direction applies to thermal cover year-round, it was calculated both with and without aspen. Aspen would provide thermal cover in the summer, but not in the winter. The existing thermal cover indicated by RIS data is distributed across the WAA (Table 22).

Table 22. Thermal Cover Distribution by Diversity Unit (After Hayman).

Diversity Unit	918	919	920	921	922	923	924	925	930
Thermal Cover Summer	28%	20%	14%	9%	4%	0%	0%	6%	8%
Thermal Cover Winter	27%	20%	13%	8%	4%	0%	0%	3%	7%

Three of the DUs were meeting the Forest Plan guidance for thermal cover (20% of forested DUs) before Hayman wildfire. After Hayman, only two are meeting the 20% level. Winter thermal cover may not be critical in this area; winters are mild, snow cover is light, and winter surveys generally find most of the elk at higher elevations on open flats. In addition, this area is part of the 11-mile Elk Herd, which is well above state population objectives. The thermal cover objective was developed from research in the Blue Mountains of Oregon and Washington (Thomas 1979). This research acknowledges that "where ponderosa pine stands were used for thermal cover, it is especially rare to find canopy closures approaching 70%."

It would appear, based on elk populations, that thermal cover is not limiting numbers even though several of the DUs are below Forest Plan standards and guidelines.

The Proposed Action and Alternatives A, B, C, and D would retain all existing thermal cover. Thinning around thermal cover patches would help protect them from future wildfire effects. Alternative E does not retain existing thermal cover and would not be consistent with current Forest Plan guidelines. Selection of Alternative E would likely require a Forest Plan Amendment. The effects of thinning through the thermal cover would likely result in an increase in aspen cover in many areas. An increase in summer thermal cover is expected in thinned areas over the long-term as aspen increases, in all alternatives.

A review of acres not treated by DU for the Proposed Action is shown below in Table 23. This table includes stands in the 41-70% and 71-100% crown closure classes (pole and sawtimber), and mature and old growth, as identified in the HABCAP model. It shows that there are significant percentages of areas in these vegetation structural stages that are not proposed for treatment. These areas include thermal cover patches, riparian buffers, extended steep slopes, stands that are already meeting desired conditions and other areas that are outside of treatment units. All of these areas that aren't already thermal cover retain the potential to move into thermal cover as stand density increases over time.

Table 23. Percentage of DU in Dense, Mature Stands Following Treatment.

DU	918	919	920	921	922	923	924	925	930
% of DU	67%	61%	22%	24%*	23%*	37%*	30%*	46%	80%

* These numbers are estimates based on the assumption that about half of Hayman burned as stand-replacing fire, while the other half was low-intensity or didn't burn. There are no treatments proposed in 922-924.

In addition, Higley (project Silviculturist) estimated that the tress left in the thinned stands would increase 3% in canopy cover each year for at least ten years following thinning. So while stands would be more open and canopies reduced over the short-term,

thinning would stimulate growth in the remaining trees. The effects of thinning would likely result in an increase in aspen cover in many areas. An increase in aspen thermal cover is expected in thinned areas over the long-term.

Cumulative Effects

In general, the cumulative effects area used is the Trout and West Creek drainages. Other activities contributing towards cumulative effects on wildlife habitats include development on adjacent private lands, timber harvest, prescribed burning, wildfire, livestock grazing, dispersed recreation, hunting, and off-road vehicle use.

Teller County has seen approximately a 70% population increase from 1990 to 1999, with increases in residences on private lands within the Forest Boundary. These have the potential to eliminate habitat, to decrease suitability because of disturbance, and for loss of some species due to harassment by pets. Further population increases are anticipated throughout 2000-2010.

There has been very little private logging reported by the Colorado State Forest Service. There has been some selective logging of larger trees on one private piece in the Trail Creek area, which also included riparian habitats.

On National Forest lands, there was a prescribed burn in the Polhemus area, with about 6,400 acres of understory of ponderosa pine and mixed conifer treated. The Hayman Wildfire (June 2002) burned about 26,800 acres in the Trout and West Creek watersheds. In addition, it is predicted that there could be an additional 2 10,500-acre wildfires in the watershed analysis area. Wildfire would reduce the density of live trees in forested areas in burned over areas and decrease habitat for species like Abert's squirrel for several decades. Most species are able to tolerate low-intensity fire with few major effects to populations, however multiple or moderate to high-intensity wildfires would likely have cumulatively significant effects.

The only timber harvest occurring on federal lands in the WAA is the Trout Creek timber sale, which mechanically thinned about 950 acres and was going to broadcast burn around 1,200 acres to reduce understory fuels. Part of this area burned in the Hayman wildfire. There is a 40-acre thinning project on the Manitou Experimental Forest. There is also personal use firewood harvest across the analysis area that results in removal of standing and downed dead trees.

The Forest has no salvage proposal for the Hayman wildfire yet. However, they are considering salvage based on the following draft criteria; suitable timber ground, within ½ mile of a road, <35% slope, moderate or high intensity burn and stands with trees 12" dbh and up (B. Post, USFS Forester, pers. comm.).

Livestock grazing occurs over about half of the proposed treatment units, with most of it occurring in the Phantom Unit. This unit also has the largest amount of perennial streams and riparian habitats. Effects of grazing include plant defoliation, mechanical changes to soil and plant material, and nutrient redistribution. These and other factors also influence successional trends. Succession is affected by grazing frequency/duration, intensity, and timing. Grazing can also alter vegetation composition. These factors then affect nesting habitat, foraging habitat, and cover for many species of wildlife.

Increases in population in Teller and adjacent counties has resulted in an increase in recreational use in both developed areas and dispersed use across the area. This use has the potential to result in a loss of habitat (trampling at dispersed sites, development of off-road trails, etc.); and disturbance and displacement as a result of human and motorized use.

The effects of recreation on wildlife have been reviewed by Joslin and Youmans (1999). Disturbance caused by recreational pursuits or other human activities may elicit behavioral and/or physiological responses in wildlife. An individual's behavioral response may vary according to season, age and sex, body size, motivational state, behavioral response of cohorts, and habitat security. Behavioral responses are also influenced by the disturbance itself, such as type of activity, distance away, direction of movement, speed, predictability, frequency and magnitude. Behavioral responses may be of short duration, such as temporary displacement, or long-term, such as abandonment of preferred foraging areas.

Developed and dispersed camping can decrease habitat suitability for some species. Species that use snags are usually negatively affected through removal of hazard trees and the use of snags for firewood. Long-term use of dispersed sites can modify the vegetation, decreasing or eliminating suitable habitat. Disturbance during breeding or nesting can also occur.

Off-route motorized use removes vegetation, increases bare soil, and increases the potential for establishment of non-native plant species. Disturbance is less predictable, and habituation of wildlife is less likely to occur.

Manitou Lake is currently drained and being worked on. It is being deepened and a deep-water-release valve is being installed. T his will help reduce stream temperatures in the lower reaches of Trout Creek, where increased stream temperatures have been affecting fish habitat. This project is not affecting any of the MIS evaluated here. Table 24 summarizes cumulative effects on MIS.

Table 24. Cumulative Effects.

Species	Cumulative Effects
Abert's squirrel	Limiting factors for this species are feeding and nesting trees. Since they use trees that are chemically distinct, tree removal that does not retain existing feeding and nesting trees could reduce suitable habitat. Currently, very little timber harvest has been done on private lands and harvest on federal lands incorporates mitigation to retain nesting and feeding trees. Wildfire has the greatest potential to affect feeding and nesting trees. Damaging crown fires (moderate and high intensity fires) result in the loss of habitat. The proposed treatments will reduce the potential for damaging crown fires and loss of habitat. An additional factor that can affect populations of this species is hunting. In the 2000-01 season, statewide harvest was up from 1999. Both hunter numbers and days hunted increased in this same time period. Harvest in Teller County was reported to be 160. In the 2001-02 season, statewide harvest was down, compared to the previous year, but hunter numbers and days hunted had also decreased. Only 21 were reported harvested in Teller County. Hunting does not appear to be having a large impact on populations in the state or in Teller County (CDOW website). None of the action alternatives contribute to a loss of habitat or populations over the watersheds.
Elk	Elk are affected by forage availability, can be displaced by subdivision and recreational use, and can be killed when crossing highways and by hunting. High open road densities may be contributing to displacement of elk onto adjacent lands where they have more security. Some larger areas of private land that aren't open to hunters are acting as refuges, and numbers are hard to reduce where they are not available to hunters. Currently, numbers are above state population objectives, and none of these factors seem to be at levels that affect populations.
Mule deer	Mule deer are affected by forb and shrub availability, can be displaced by subdivision and recreational use, and can be killed when crossing highways and by hunting. Currently, numbers are above state population objectives, and none of these factors seem to be at levels that affect populations.
Mountain bluebird	Availability of cavities appears to be the limiting factor for this species. There are "bluebird trails" in the project area, a series of bluebird boxes that are maintained by individuals from the area, as well as bluebird houses put up around residences. These nest boxes have increased the availability of nesting habitat. Firewood cutting on federal lands, private timber harvest, and wildfire reduce snag availability. The proposed treatments, with mitigation, will reduce the potential for loss of habitat thru wildfire. Based on available population trend information, populations are increasing in Colorado and this trend would be expected to continue.
Red-naped sapsucker	This species uses older, mature, live trees. Harvest on federal or private lands have the potential to reduce habitat. The Trout Creek timber sale on federal lands retained the older, mature trees and habitat for this species was maintained in the project area and could result in an increase in aspen. The harvest that has been occurring on private land has taken the larger, older trees. Currently this appears to be at very low levels and has no affect on overall habitat in the WAA. Wildfire also reduces habitat over the short-term, but can result in an increase in aspen stands over the long-term. Habitat for this species should be maintained over the long-term.

Species	Cumulative Effects
Merriam's turkey	This species uses older, mature, live trees. Harvest on federal or private lands have the potential to reduce habitat. The Trout Creek timber sale on federal lands retained the older, mature trees and habitat for this species was maintained in the project area. The harvest that has been occurring on private land has taken the larger, older trees. Currently this appears to be at very low levels and has no affect on overall habitat in the WAA. Wildfire also affects habitat. It can be beneficial in improving foraging habitat in the understory, but can also result in the loss of roost habitat in older, larger trees.

Consistency with Forest Plan

General standards and guidelines from the Forest Plan have been incorporated as mitigation measures. These include snag and downed woody debris direction as well as direction for protection of Abert's squirrel stands, turkey roosts, and goshawk and flammulated owl nest buffers. In addition, the Proposed Action and Alternatives A, B, C, and D incorporate riparian buffers and retention of existing thermal cover. Alternative E does not incorporate these mitigation features and a site-specific Forest Plan amendment would be needed for implementation of that alternative.

Habitat Capability. There is direction for maintenance of at least 40% habitat capability for MIS in each DU. As was shown in the analysis, most of the DUs are not meeting this under the existing condition. However, the existing habitat capability was maintained or increased for all except three of the species: Abert's squirrel, red-naped sapsucker, and three-toed woodpecker. As was shown in the analysis, the modeling may not have adequately addressed these species. For example, retention of Abert's squirrel nesting and feeding trees and retention of older, mature trees and expected increases in aspen would favor red-naped sapsucker. Alternative E would be less favorable for Abert's squirrel because it does not retain the clumpiness in treated stands; this would tend to isolate nesting and feeding trees and make them more vulnerable to predation when moving between areas. The Three-toed woodpecker has a pre-Hayman value of 55%, and dropped to 40% post-Hayman. The proposed treatments would drop it to 38%. While the treatments result in a small decrease in habitat capability, this is offset by the reduced potential for stand-replacing fire.

The Forest Plan also included direction for habitat capability by Management Area. While it is predicted that these also are currently below Forest Plan direction, it is expected that will be maintained at least at current levels for all alternatives except E, based on the previous analysis by DU. The two management areas with direction for managing for 80% habitat capability are 4B and 9B. No treatments are proposed in these two management areas except under Alternative E. Alternative proposes helicopter logging in 4B and does not include the riparian buffer (9B).

Thermal cover. The Forest Plan contains direction for retention of thermal cover by DU. Sufficient acreage is left unthinned in the Proposed Action and Alternatives A, B, and D to meet the Forest Plan direction. Thinning around thermal cover patches would help protect them from future wildfire effects. Alternative E does not retain existing thermal cover and therefore would not be consistent with current Forest Plan direction. Alternative E would require a site-specific Forest Plan amendment.

Old growth habitats. The Forest Plan includes direction to maintain 10% of each DU in old growth forest. As was discussed previously, the area is below the guidelines, largely because of historic logging at the turn of the last century. Because old growth ponderosa pine stands were open historically and the silvicultural prescriptions retain the larger, older trees, the treatments will actually favor recruitment of old growth in the future. Remaining trees will see an approximate 3% increase in crown closure by year, and stands will have a reduced risk of loss to wildfire.

Summary – Comparison of Alternatives

Table 25 ranks the project alternatives based on impacts to MIS, where a rating of '1' is considered best, or most favorable to the species in question.

Table 25. Ranking of Alternatives on MIS

Alternative	No Action	Proposed Action	A	B	C	D	E
Abert's squirrel	4	1	1	2	1	3	2
Elk and Mule deer	4	3	3	3	3	2	1
Mountain bluebird	5	2	2	3	2	4	1
Red-naped sapsucker	3	1	1	2	1	3	1
Merriam's turkey	4	1	1	2	1	3	1

All of the action alternatives improve conditions for MIS over the No Action alternative. This is a result of the risk of wildfire, about half of which could be stand-replacing, and result in a loss of habitat for the long-term.

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